

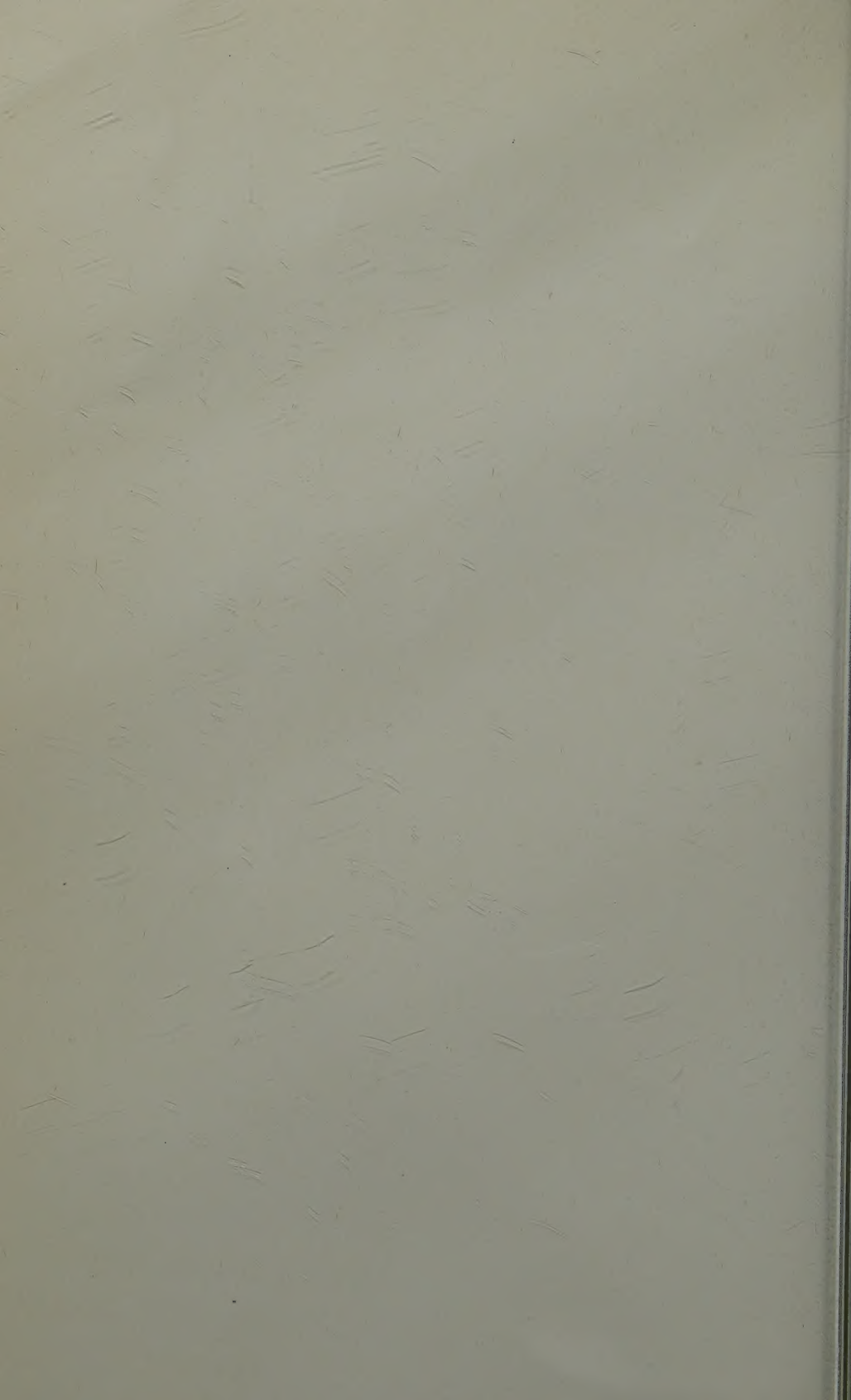
THE POLAR RECORD

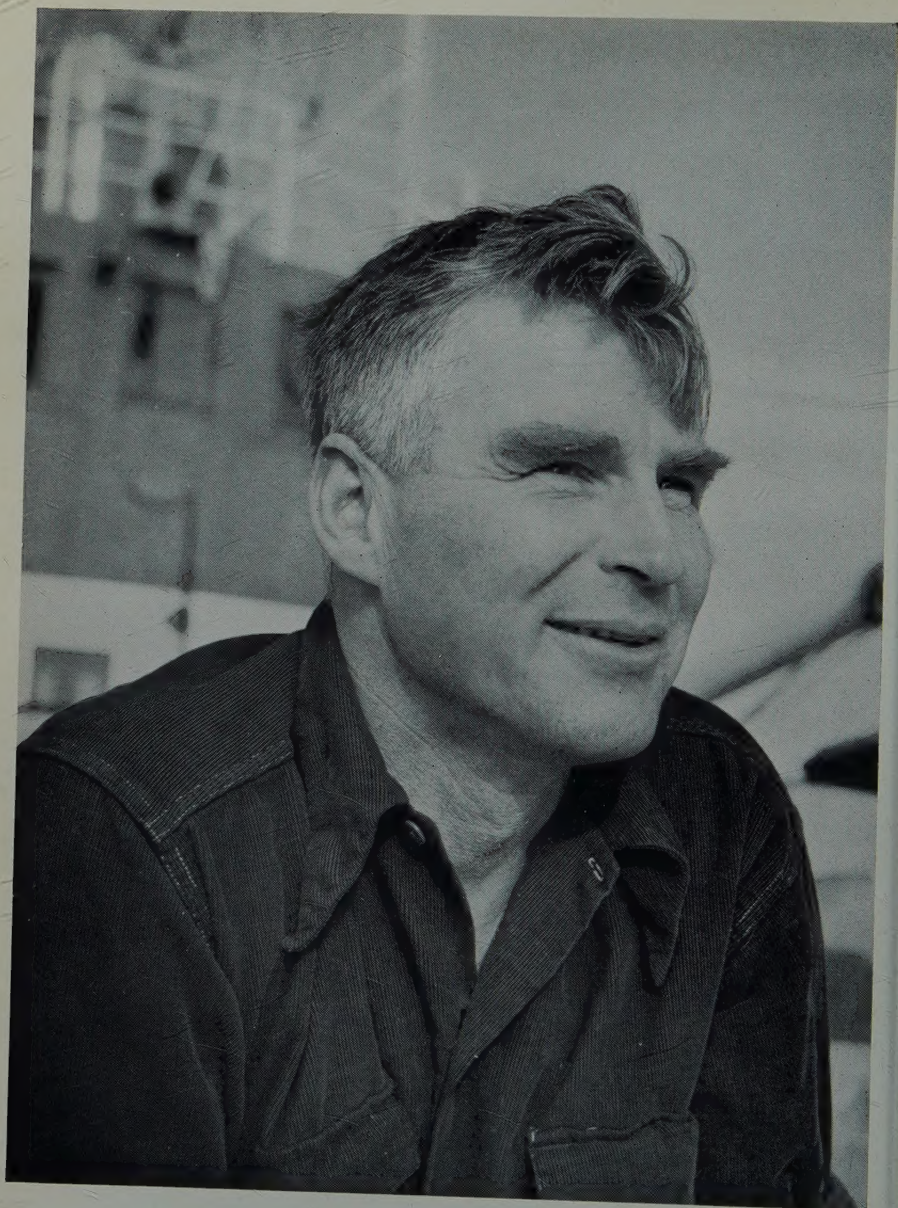
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SIR VIVIAN FUCHS

THE POLAR RECORD

Editor: L. M. Forbes. Editorial Committee: B. B. Roberts, J. A. Steers,
J. M. Wordie

Vol. 9 May, 1958 No. 59

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FOREWORD

The frontispiece of this issue is a photograph of Dr V. E. Fuchs, who has successfully organized and led the first party to cross the Antarctic continent. On 2 March the trans-continental party, accompanied by Sir Edmund Hillary, reached "Scott Base" at the end of the 99-day journey from "Shackleton". The Trans-Antarctic Expedition formally began in June 1955. At the end of the year the advance party, accompanied by Dr Fuchs, Sir Edmund and other members of the main party, sailed for Antarctica on the *Theron*. A site for the base on the Weddell Sea coast was chosen and the advance party built "Shackleton" during 1956. At the same time three members of the New Zealand party had visited the McMurdo Sound area with the United States Operation "Deep Freeze I" to select a site for the New Zealand base. The British main party arrived at "Shackleton" in January 1957 and the New Zealand party at the site of "Scott Base" the same month. In April "South Ice" was established about 300 miles south of "Shackleton", and manned during the winter by three scientists.

The New Zealand party began sledging activities in September and, having laid the required depots, Sir Edmund Hillary went on to reach the South Pole on 4 January 1958. The trans-continental party left "Shackleton" on 24 November 1957, reached the South Pole on 19 January 1958 and "Scott Base" on 3 March. The total distance travelled was about 2200 miles, and included an initial very difficult terrain. The expedition's scientific programme was maintained throughout the journey. Dr Fuchs has received a knighthood and the special gold medal of the Royal Geographical Society. The Society's Founder's medal has been awarded to Sir Edmund Hillary. We congratulate all who have been concerned in the planning, organization and execution of this expedition.

The Royal Geographical Society has also announced the award of the Patron's medal to Dr Paul A. Siple, a member of many United States Antarctic expeditions, and leader of the first I.G.Y. party to spend a year at the South Pole; the Back Grant to Monsieur B. Imbert, who is in charge of the French I.G.Y. Antarctic expeditions; and the Mrs Patrick Ness Award to Captain A. G. Bomford, R.E., chief surveyor of the South Georgia Survey, 1955-56.

We welcome Dr G. de Q. Robin, the new Director of the Scott Polar Research Institute, who took up his appointment on 1 April.

April 1958

ILLUSTRATED ICE GLOSSARY. PART 2

BY TERENCE ARMSTRONG AND BRIAN ROBERTS

[MS. received 14 March 1958.]

Introduction

This glossary is mainly concerned with land ice and associated terms, and is therefore complementary to the glossary of predominantly sea ice terms published in the *Polar Record*, Vol. 8, No. 52, 1956, p. 4-12. It is hoped that the two, taken together and incorporating any necessary amendments, will form the basis of a Special Publication which the Institute hopes to issue when funds allow.

Once again, the list aims to cover the *minimum* number of terms required by anyone concerned with a polar environment. The present version is provisional and comments will be welcomed. The Institute would be grateful for any photographs which illustrate the terms better than those published here.

Frost action and frozen ground terms have not been included because it is considered that there is still insufficient agreement on these terms and their definitions.

In compiling this glossary, account has been taken of the draft international classification of snow put forward by V. J. Schaefer, G. J. Klein and M. R. de Quervain (*Entwurf einer internationalen Schneeklassifikation. Union Géodésique et Géophysique Internationale. Association d'Hydrologie Scientifique. Assemblée Générale de Bruxelles, 1951, Tome 1, p. 129-41*).

Acknowledgements

The authors would like to record their gratitude to the Friends of the Polar Institute, who have made a grant to cover the cost of the blocks for the accompanying illustrations. The Director of the Meteorological Office has been most helpful in checking and amending the meteorological terms and definitions to ensure conformity with the agreed terminology of the World Meteorological Organization.

We also wish to thank W. E. Hampton, John Heap, H. H. Lamb, W. V. Lewis, Dr J. H. Roscoe, Capt. H. E. Saunders, Gerald Seligman and Dr Charles Swithinbank for their help.

Grateful acknowledgement is made to the following for permission to use their photographs: Antarctic Division of the Australian Department of External Affairs (Fig. 25), Expéditions Polaires Françaises (Fig. 15), Richard Harrington (Fig. 14), Ernst Hofer (Fig. 5), Juneau Ice Field Research Project and Office of Naval Research (Fig. 10), W. V. Lewis (Figs. 2, 22 and 30), Lady Malden (for Frank Smythe's photograph, Fig. 24), Fritz Müller (Fig. 9), D. Napier and Son Ltd. (Figs. 27 and 28), National Institute of Oceanography (Fig. 26), Norwegian-British-Swedish Antarctic Expedition, 1949-52 (Fig. 8),

Dr Max Oechslin (Fig. 1), Dr K. H. Roscoe (Fig. 29), Royal Canadian Air Force (Figs. 6 and 7), G. R. Sankey (Fig. 23), Gerald Seligman (Figs. 4 and 17-20), Dr Charles Swithinbank (Figs. 11, 12, 13 and 16).

Glossary

(NOTE. *All terms in italics will be found defined elsewhere in this glossary or in Part 1.*)

AVALANCHE

Fig. 1

Mass of *snow* which becomes detached and slides down a mountain side, often acquiring great bulk by fresh accumulations as it descends.

ANTI-ICING

The prevention of ice accumulation on aircraft, ships and other objects. The most common measures are heating or the application of a dressing by brush or spray to weaken adhesion and facilitate removal (cf. *De-icing*).

BERGSCHRUND

Fig. 3

The *crevasse* which occurs at the head of a *cirque* or *valley glacier* and which separates the moving glacier ice from the rock wall and the *ice apron* attached to it. When the ice apron is absent the gap is known as a *Randkluft*.

BLOW HOLE

Opening through a *snow bridge* into a *crevasse* or system of crevasses which are otherwise sealed by snow bridges. The current of air drawn from the hole by prevailing surface winds causes a *snowdrift* on the lee side.

BLOWING SNOW

An ensemble of *snow* particles raised by the wind to moderate or great heights above the ground. The horizontal visibility at eye level is generally very poor. The snow particles are nearly always violently stirred up by the wind (cf. *Drifting snow*).

BREAKABLE CRUST

Fig. 18

A dry compact *snow* surface which will break under the weight of a turning skier.

CIRQUE GLACIER

Fig. 6

A *glacier* which occupies a separate rounded niche which it has formed on a mountain side.

CORNICE

Fig. 4

An overhanging accumulation of *ice* and wind-blown *snow* on the edge of a ridge or cliff face.

CREVASSE

Fig. 12

A fissure formed in a *glacier*. Transverse crevasses are found where a glacier falls over a step; longitudinal crevasses develop where the ice has been able to spread laterally. Crevasses are often hidden by *snow bridges*.

CRUST

Figs. 18, 19, 20

A hard *snow* surface lying upon a softer layer. Crust may be formed by sun, rain, or wind, and is described as *breakable crust* or *unbreakable crust*.

DE-ICING

The removal of *ice* accumulation on aircraft, ships and other objects by ice pick, shovel, steam jet, chemical treatment, mechanical devices, etc. (cf. *Anti-icing*).

DEPTH OF SNOW

The vertical distance between the surface of a *snow* layer and the ground beneath, assuming the layer to be evenly spread, e.g. the average or representative depth for the area.

DRIFTING SNOW

Fig. 13

An ensemble of *snow* particles raised by the wind to small heights above the ground. The visibility is not sensibly diminished at eye level. The motion of the snow particles is more or less parallel to the ground (cf. *Blowing snow*).

FIRN

Old snow which has been transformed into a dense material. Firn is characterized by the fact that (a) the particles are to some extent joined together, but that (b) the air interstices still communicate with each other. (a) distinguishes it from *snow*, and (b) from *ice*.

FREEZING DRIZZLE

Drizzle, the drops of which freeze on impact with the ground or with objects on the earth's surface or with aircraft in flight.

FREEZING RAIN

Rain, the drops of which freeze on impact with the ground or with objects on the earth's surface or with aircraft in flight.

GLACIATED

Fig. 30

Land covered in the past by any form of *glacier* is said to be glaciated (cf. *Ice covered*).

GLACIER ICE

Any *ice* originating from a *glacier*, whether on land or floating in the sea as *icebergs*.

GLACIERIZED

See *Ice covered*.

GLAZE (CLEAR ICE)

A generally homogeneous and transparent deposit of *ice* formed by the freezing of supercooled drizzle droplets or raindrops on objects the surface temperature of which is below or slightly above 0° C. (32° F.). It may also be produced by the freezing of non-supercooled drizzle droplets or raindrops immediately after impact with surfaces the temperature of which is well below 0° C. (32° F.).

HAIL

Precipitation of small balls or pieces of *ice* (hailstones) with a diameter ranging from 5 to 50 mm., or sometimes more, falling either separately or agglomerated into irregular lumps.

HOARFROST

Fig. 24

A deposit of *ice* having a crystalline appearance, generally assuming the form of scales, needles, feathers or fans; produced in a manner similar to dew (i.e. by condensation of water vapour from the air), but at a temperature below 0° C. (32° F.).

ICE

The solid form of water, in nature formed either by (a) the freezing of water as in the case of river or sea ice, (b) the condensation of atmospheric water vapour direct into *ice crystals*, (c) the compaction of *snow* with or without the motion of a *glacier*, or (d) the impregnation of porous snow masses with water which subsequently freezes.

ICE APRON

Fig. 3

A thin mass of *snow* and *ice* adhering to a mountain side (cf. *Bergschrund*).

ICE CAP

Fig. 7

A dome-shaped *glacier* usually covering a highland area. Ice caps are considerably smaller in extent than *ice sheets*.

ICE COVERED

Fig. 7

Land overlaid at present by an extensive *glacier* is said to be ice covered. The alternative term "glacierized" has not yet found general favour (cf. *Glaciated*).

ICE CRYSTAL

A single *ice* particle with regular structure.

ICE FALL

Fig. 2

A heavily *crevassed* area in a *glacier* at a point of steep descent.

ICE FOG

A suspension of numerous minute *ice crystals* in the air, reducing visibility at the earth's surface. The crystals often glitter in the sunshine. Ice fog produces optical phenomena such as luminous pillars, small haloes, etc.

ICE JAM

An accumulation of broken river or sea ice caught in a narrow channel.

ICEPORT

Fig. 25

An embayment in an *ice front*, often of a temporary nature, where ships can moor alongside and unload directly onto the *ice shelf*.

ICE PRISMS

A fall of unbranched *ice crystals*, in the form of needles, columns or plates, often so tiny that they seem to be suspended in the air. These crystals may fall from a cloud or from a cloudless sky. They are visible mainly when they

glitter in the sunshine (diamond dust); they may then produce a luminous pillar or other halo phenomena. This hydrometeor, which is frequent in polar regions, occurs at very low temperatures and in stable air masses

ICE STREAM

Fig. 29

Part of an *ice sheet* in which the *ice* flows more rapidly and not necessarily in the same direction as the surrounding ice. The margins are sometimes clearly marked by a change in direction of the surface slope, but may be indistinct.

ICICLE

Hanging spike of clear *ice* formed by the freezing of dripping water.

ICING

Figs. 26, 27, 28

The accumulation of a deposit of *ice* on exposed objects, e.g. aircraft, ships, aerials, instruments (anemometers, thermometer screens), etc. The *ice* may be either dense and clear (transparent), or white and opaque, or anything in between. Icing may be produced by the deposition of water vapour as frost (in this case quantities are usually very small and only of any importance to aircraft), or by the freezing on impact of droplets suspended in the air (e.g. supercooled fogs, cloud droplets, supercooled drizzle and rain, or, in the case of ships, sea spray or breaking waves).

MORaine

Fig. 10

Ridges or deposits of earth and boulders formed on or near *glaciers* and consisting of debris transported by the *ice*. Common forms are: ground moraine, formed under an *ice sheet*; lateral moraine, along the sides of a glacier; medial moraine, down the centre; and end moraine, deposited at the foot. Moraines are a characteristic feature of a glacier, and are left after the glacier has receded, providing evidence of its former extent.

NEW SNOW

Fig. 11

A recent *snow* deposit in which the original form of the *ice crystals* can be recognized; usually the daily new snowfall, measured in the morning (cf. *Powder snow*).

NUNATAK

Fig. 3

A rocky crag or small mountain projecting from and surrounded by a glacier or *ice sheet*.

OLD SNOW

Deposited *snow* whose transformation into *firn* is so far advanced that the original form of the *ice crystals* can no longer be recognized (cf. *Firn*).

PIEDMONT GLACIER

Fig. 9

A lobe-shaped *glacier* formed by coalescence of the lower parts of *valley glaciers* which spread over low-lying areas at the foot of mountains (cf. *Ice piedmont*).

POWDER SNOW

A thin, dry *snow* surface which is composed of loose, fresh *ice crystals* (cf. *New snow*).

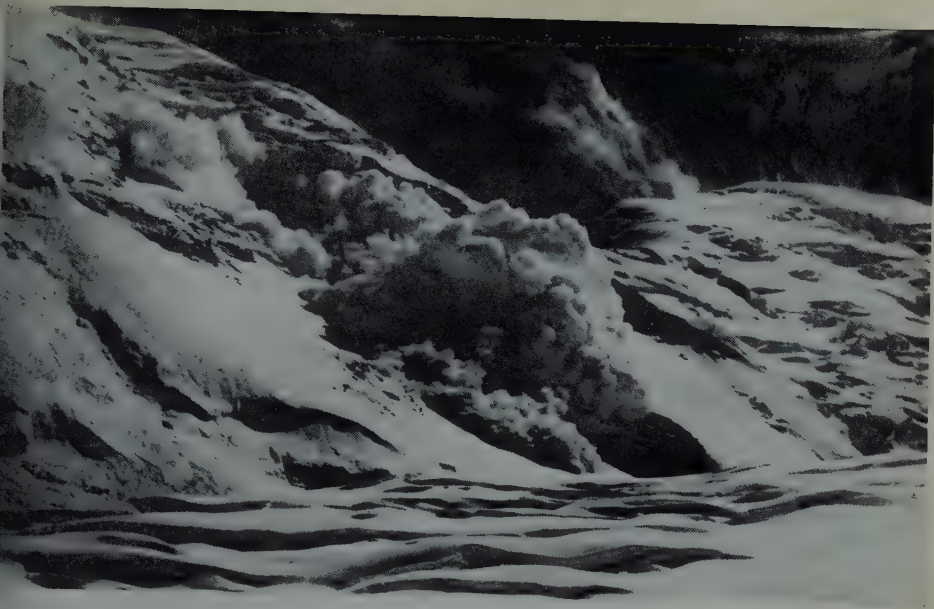


Fig. 1. AVALANCHE.



Fig. 2. ICE FALL.

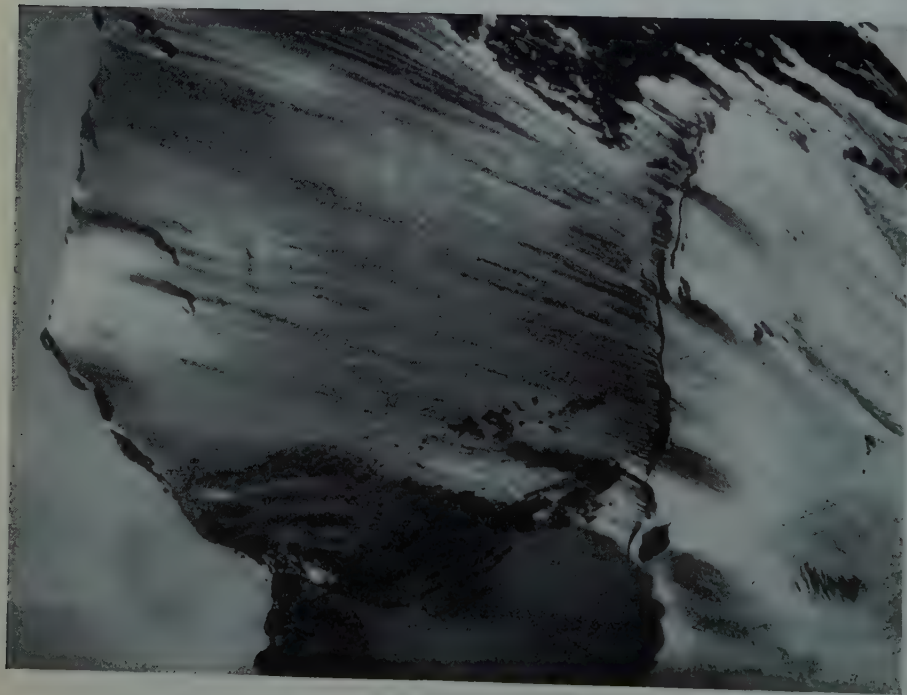


Fig. 3—BERGSCHREIND. An ice aurora is seen covering the



Fig. 4. CORNICE.

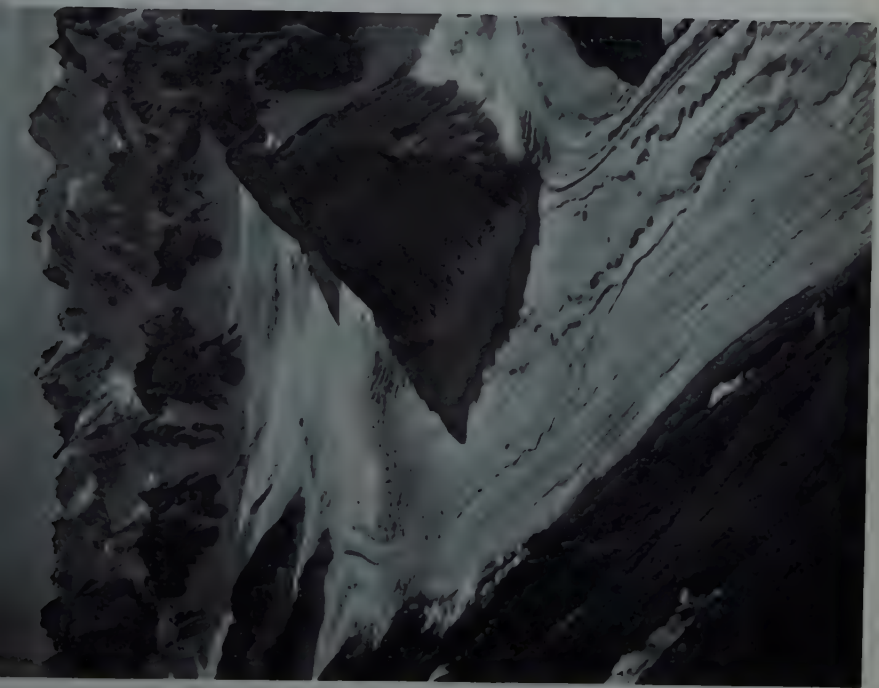


Fig. 5. VALLEY GLACIER.

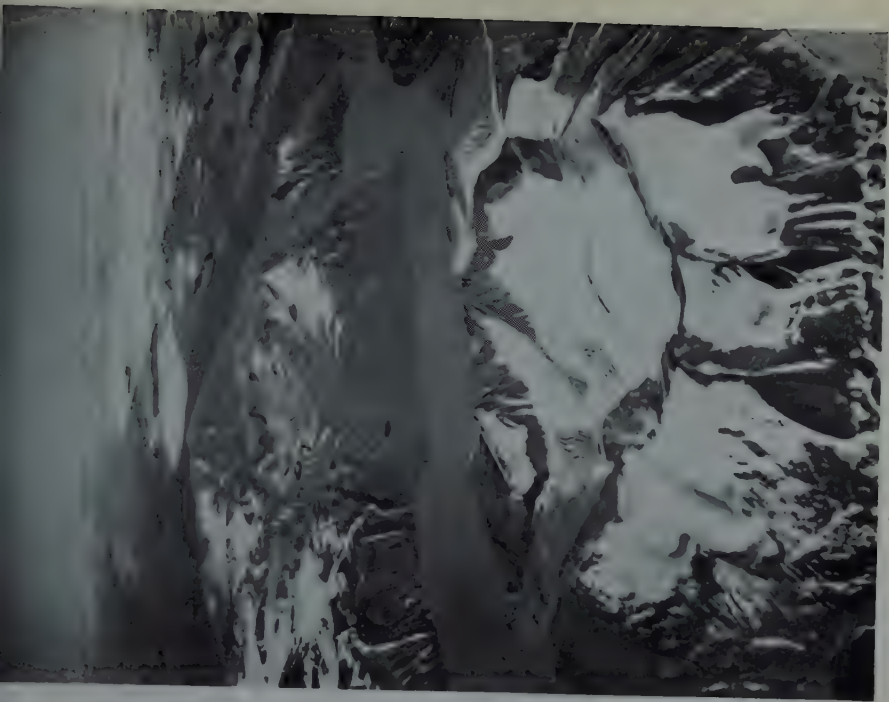


Fig. 6. CIRQUE GLACIER.

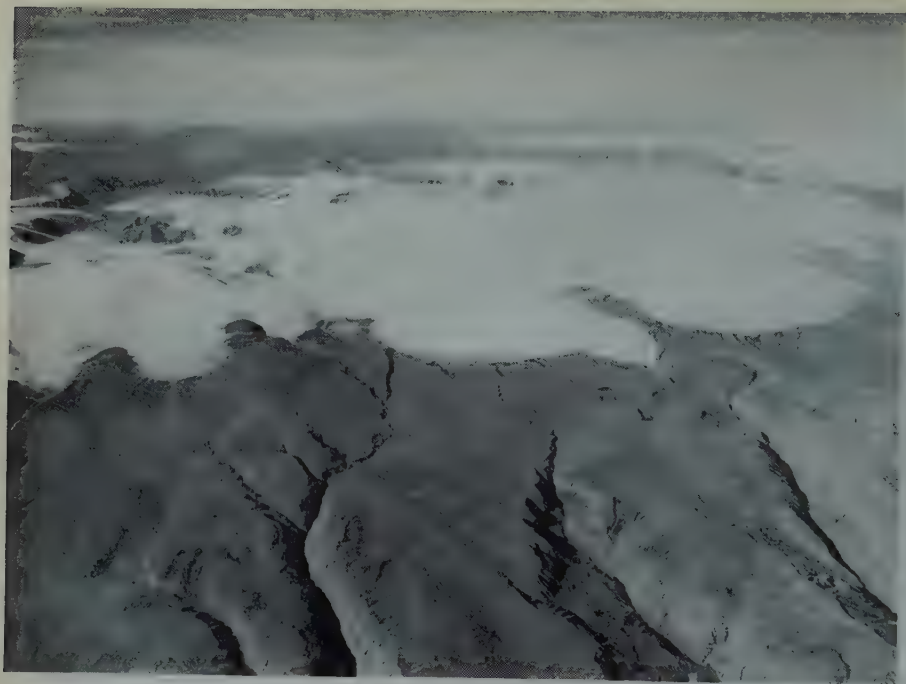


Fig. 7. ICE CAP. Air photograph from 5,000 m. above ground level.



Fig. 8. NUNATAKS. Air photograph from 3,000 m. above *ice sheet*.



Fig. 9. PIEDMONT GLACIER.



Fig. 10. MORAINES in *valley glacier*.



Fig. 11. SKAVLER.



Fig. 12. CREVASSE. A *snow bridge* conceals the crevasse where the man is probing.



Fig. 13. DRIFTING SNOW.



Fig. 14. SNOWDRIFT.

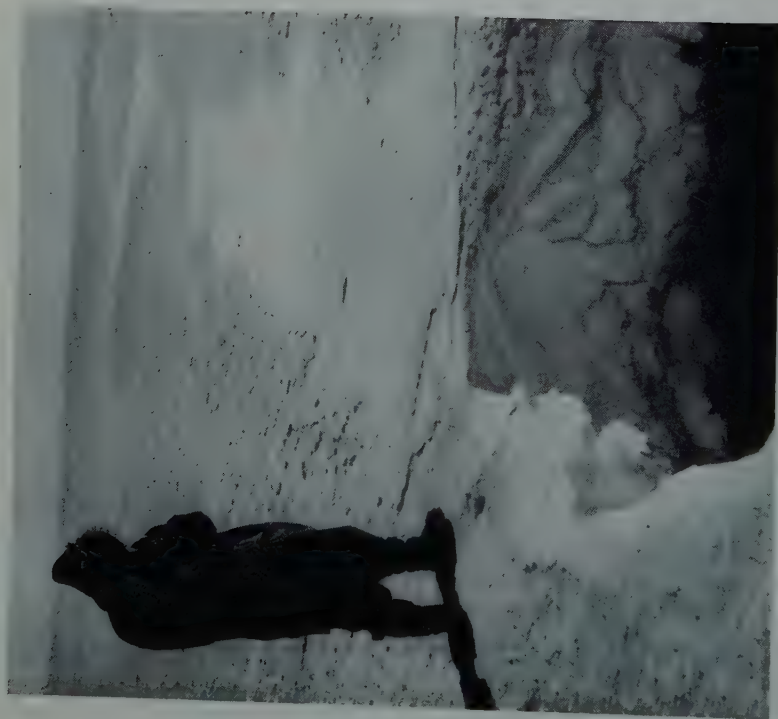


Fig. 15. SNOW BRIDGE. The line of the bridged *crasse* extends into the right background.



Fig. 16. STRAND CRACK.

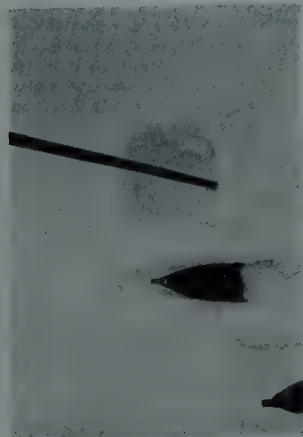


Fig. 17. NEW SNOW.



Fig. 18. BREAKABLE CRUST. The early stages of crust formation.

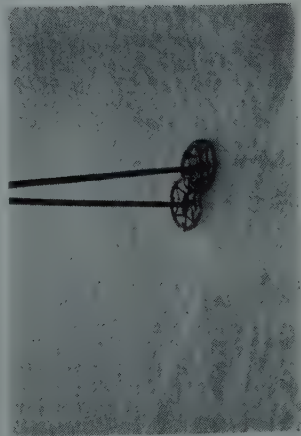


Fig. 19. UNBREAKABLE CRUST.



Fig. 20. UNBREAKABLE CRUST.

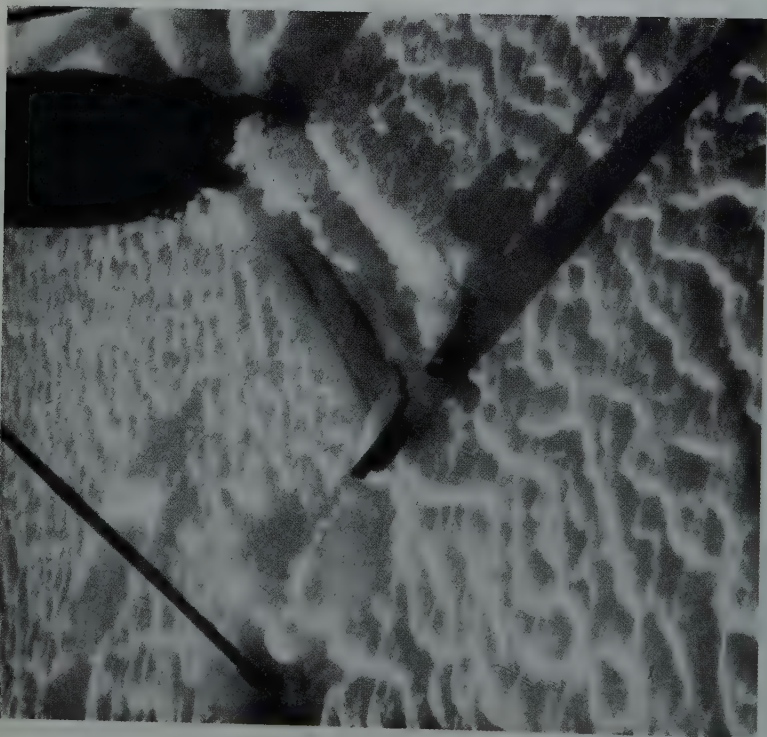


Fig. 21. RIPPLE MARKS.

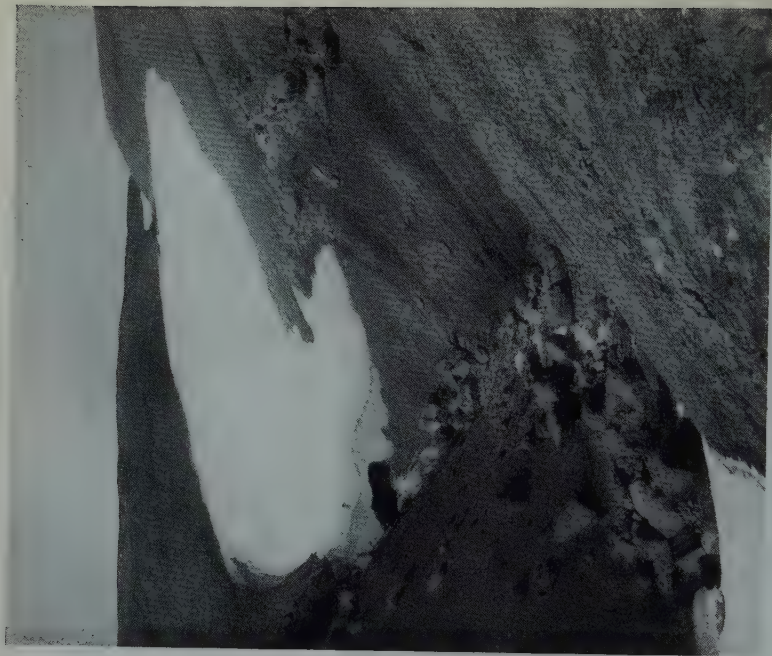


Fig. 22. SNOW PATCH.



Fig. 23. RIME.



Fig. 24. HOAR FROST.



Fig. 25. ICEPORT.



Fig. 26. ICING. Sea spray frozen on superstructure of ship.



Fig. 27. ICING. Ice forming on spinner, propeller root leading edges and engine intake cowl of aircraft.

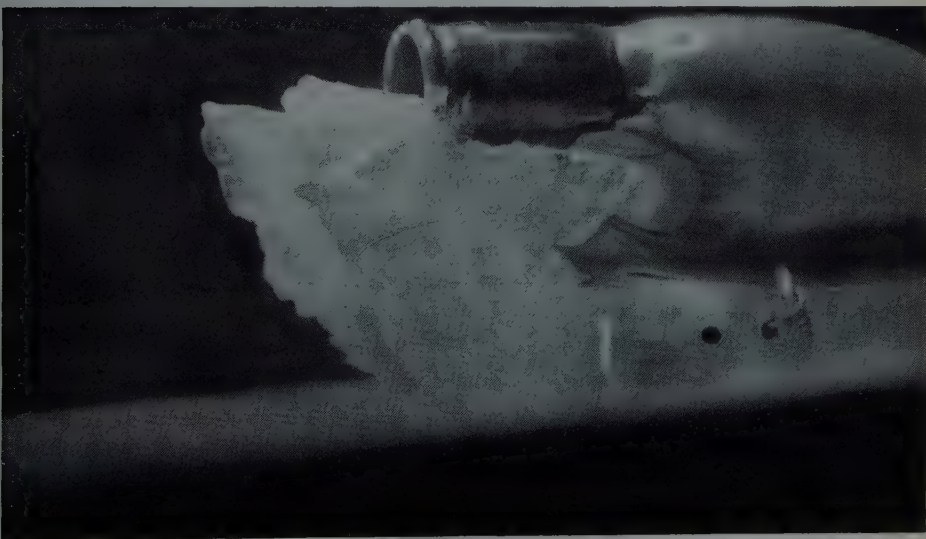


Fig. 28. ICING. Ice building up ahead of air intake on aircraft engine nacelle.



Fig. 29. ICE STREAM. Arrow indicates direction of flow.



Fig. 30. GLACIATED valley.

RANDKLUFF

See *Bergschrund*.

RIME

Fig. 23

A deposit of *ice* composed of grains more or less separated by trapped air, sometimes adorned with crystalline branches, produced by the rapid freezing of supercooled and very small water droplets.

RIPPLE MARKS

Fig. 21

A *snow* surface corrugated by wind (as on sand).

SKAVLER (singular SKAVL)

Fig. 11

Sharp, irregular ridges formed on a *snow* surface by wind erosion and deposition.

SLUSH

Snow which is saturated or mixed with water, found on land or as a viscous floating mass in water.

SNOW

Precipitation of *ice crystals*, most of which are branched (sometimes star-shaped). The branched crystals are sometimes mixed with unbranched crystals. At temperatures higher than about -5°C . (23°F .) the crystals are generally agglomerated into snowflakes.

SNOW BARCHAN

A horseshoe-shaped *snowdrift*, with the ends pointing down-wind.

SNOW BRIDGE

Fig. 15

An arch formed by *snow* which has drifted across a *crevasse*, forming first a *cornice* and ultimately a covering which may completely obscure the opening.

SNOW CORNICE

See *Cornice*.

SNOW COVER

State of ground partly (usually taken as more than half) or wholly covered with *snow*.

SNOWDRIFT

Fig. 14

An accumulation of wind-blown *snow* deposited in the lee of obstructions or heaped by wind eddies.

SNOWFLAKE

See *Snow*.

SNOW LINE

The line or zone on land that separates the region in which fallen *snow* is not entirely melted during summer from that at lower altitude on which the snow disappears in summer. The altitude of the snow line is controlled by temperature and the amount of snowfall.

SNOW PATCH

Fig. 22

An isolated area of *snow*, lying above or below the regional *snow line*, which may last throughout the summer but is composed of *firn*.

STRAND CRACK

Fig. 16

A fissure at the junction between an *inland ice sheet*, *ice piedmont* or *ice rise* and an *ice shelf*, the latter being subject to the rise and fall of the tide.

UNBREAKABLE CRUST

Figs. 19, 20

A dry, compact *snow* surface which does not break under the weight of a turning skier.

VALLEY GLACIER

Figs. 5, 10

A *glacier* which flows down a valley.

WHITEOUT

A condition in which daylight is diffused by multiple reflexion between a *snow* surface and overcast clouds. Contrasts vanish and the observer is unable to distinguish the horizon or any snow surface feature.

CHRONOLOGICAL LIST OF ANTARCTIC EXPEDITIONS

BY BRIAN ROBERTS

[MS. received 22 February 1958.]

This list was first published in the second edition of the *Antarctic Pilot* (London, Hydrographic Department, 1948, p. 6-25). Since that time it has been possible to make a large number of important corrections and additions. A check-list of this kind has been found necessary for classifying original log books, published narratives and other documents connected with the expeditions. It is hoped that it will also prove of value to those engaged in Antarctic research who may wish to check which expeditions have visited any particular area.

It has been convenient to restrict the list to the region covered by the *Antarctic Pilot*. This includes the following isolated islands and groups of islands in the Southern Ocean besides those lying close off the coast of Antarctica: South Georgia, South Sandwich Islands, South Orkney Islands, South Shetland Islands, Bouvetøya, Prince Edward Islands, Iles Crozet, Iles de Kerguelen, Heard Island, McDonald Islands, Macquarie Island and Peter I Øy.

This work does not attempt to give due weight to the relative significance of each voyage; the aim has been rather to record as briefly as possible the chronology of discovery, exploitation, mapping, scientific work and administration in the Antarctic. In the earlier version, sealing and whaling voyages made solely for commercial reasons were omitted unless new geographical discoveries were reported, or surveys made. The present list includes a large number of additional voyages, which have been added for their historical interest. Many of these early sealers and whalers have left their mark in place-names which still survive. Their unrestricted enterprise led in due course to the measures of national and international control which are also recorded. Emphasis has been placed on the pioneer enterprises in each region. Thus, every vessel known to have operated in the South Shetland Islands between 1819 and 1822 is recorded (and it is clear that the list is still very far from complete). Many of the later visits to islands in the Southern Ocean are not mentioned, unless special investigations were made, after the dates when each of these island groups became regular ports of call. This treatment tends to obscure the extensive sealing operations at the sub-Antarctic islands during the nineteenth century, and the even more important whaling operations in the Antarctic during the last fifty years. It must not be forgotten that the whaling and sealing industries have been responsible for financing a large proportion of the research and exploration in the Antarctic; but since 1931 pelagic whaling has been largely unconcerned with harbours and lands, or with their territorial waters.

Except in cases where priority of date seems significant, contemporaneous voyages are arranged in the alphabetical order of the names of the vessels. Whenever two leaders or commanders are listed for a single ship the first was the leader or scientist in charge of operations and the second was the officer in executive command of the ship.

The most important events in Antarctic political and administrative history (e.g. territorial claims, laws, regulations, etc.) have also been included, in order to bring out the significance of some contemporary activities in the Antarctic.

The place-names are those in British official use today unless otherwise indicated.

It is likely that errors have crept into a work of this nature, and the author will welcome corrections and additions.

Whilst much research has been done on United States whaling and sealing voyages to the Antarctic during the nineteenth century, it is clear that British whaling and sealing voyages during that period would well repay further investigation. Little serious search for original records has been undertaken except for the early sealing in the South Shetland Islands from 1819 to about 1824.

The sources of this work are too many and varied to acknowledge individually. The writer wishes to thank Miss Ena Thomas and the staff of the Scott Polar Research Institute for much help and encouragement in the checking of facts. Special thanks are also due to Capt. Harold Saunders, Dr. Kenneth Bertrand and Mr Edouard A. Stackpole for many valuable comments on the draft entries relating to early United States expeditions.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
c. 650	Polynesian voyage Rarotongan legends leave little doubt that about this date Ui-te-Rangiora and other Polynesians sailed as far south as the frozen ocean	Ui-te-Rangiora	Canoe <i>Te-Ivi-o-Atea</i>
1675	British expedition Probably discovered South Georgia	Antonio de la Roché	?
1738-39	French expedition Discovered Bouvetøya in January 1739	Jean-François-Charles Bouvet de Lozier ¹ Monsieur Hays	<i>Aigle Marie</i>
1756	Spanish trading voyage (from Lima to Cadiz) Sighted and circumnavigated "Isla de San Pedro" (South Georgia)	? ²	<i>León</i>
1762	? Reported discovery of "Aurora Islands" in lat. 53° S., long. 48° W. (now identified as Shag Rocks)	?	<i>Aurora</i>

¹ Senior commander.

² Commander unknown. Voyage described by a passenger, le Sieur Ducloz Guyot.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1771-72	French expedition	Yves Joseph de Kerguelen-Trémarec ¹ (1st voyage) Monsieur de Saint-Allouarn	<i>Fortune</i> <i>Gros-Ventre</i>
	Discovered Iles de Kerguelen on 12 February 1772 and took possession for France at Anse du Gros-Ventre		
1771-72	French expedition	Marion-Dufresne ¹ ?	<i>Mascarin</i> <i>Marquis de Castries</i>
	Discovered Prince Edward Islands on 13 January 1772 and Iles Crozet on 23 January 1772; landed on Ile de la Possession and took possession of the latter group for King Louis XV on 24 January 1772		
1772-75 ²	British expedition	James Cook ¹ (2nd voyage) Tobias Furneaux	H.M.S. <i>Resolution</i> H.M.S. <i>Adventure</i>
	Circumnavigated the world in high southern latitude; crossed Antarctic Circle for first time and dispelled idea of a southern continent extending to temperate latitudes; landed in South Georgia and took possession for King George III in Possession Bay on 17 January 1775; searched unsuccessfully for Bouvetøya; discovered southern South Sandwich Islands on 30 January 1775. Furneaux, with H.M.S. <i>Adventure</i> , also searched unsuccessfully for Bouvetøya		
1773-74	French expedition	Yves Joseph de Kerguelen-Trémarec ¹ (2nd voyage) Capt. de Rosnevet Capt. Ferron	<i>Rolland</i> <i>Oiseau</i> <i>Dauphine</i>
	Revisited and roughly charted the west coast of Iles de Kerguelen; again took possession for France at Baie de l'Oiseau on 6 January 1774		
1776-80	British expedition	James Cook ¹ (3rd voyage) Charles Clerke	H.M.S. <i>Resolution</i> H.M.S. <i>Discovery</i>
	Visited Prince Edward Islands and Iles de Kerguelen, naming the former group		
1789-94	Spanish expedition	Alejandro Malaspina José de Bustamante	<i>Descubierta</i> <i>Atrevida</i>
	<i>Atrevida</i> was sent in 1794 to ascertain position of "Aurora Islands" and reported three rocks in lat. 53° S., long. 48° W. (now identified as Shag Rocks)		
1790	[Spanish?] expedition	Manuel de Oyarvido	<i>Principessa</i>
	Sighted "Aurora Islands" (now identified as Shag Rocks)		
1790-92	United States sealing expedition (from New Haven)	Daniel F. Greene Roswell Woodward	? ?
	Two vessels (names unknown), sent out by Elijah Austin, visited South Georgia. ³ Capt. Greene was the first to take Fur Seal skins to the China market, circumnavigating the globe during this voyage		

¹ Senior commander.

² Following Cook's account of his discoveries, British sealers started work at South Georgia in 1778. They were soon followed by Americans and the industry developed rapidly. In 1791, there were at least 102 vessels engaged in securing Fur Seals and Elephant Seal oil in the Southern Ocean, but there is no certain information of new discoveries by these sealers until the beginning of the nineteenth century.

³ This voyage marked beginning of United States sealing industry at South Georgia.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1791-94	United States whaling and sealing expedition (from Nantucket) First American sealers to visit Iles de Kerguelen	Bartlett Coffin ¹ Elijah Coffin Simeon Starbuck	<i>Alliance</i> <i>Asia</i> <i>Hunter</i>
1791-?	British sealing expedition Visited South Georgia	Capt. Pitman	<i>Ann</i>
1798-?	United States whaling and sealing expedition (from New Bedford) Visited Iles de Kerguelen. Captured, homeward bound, by French privateer <i>Reliance</i> ; recaptured by United States brig <i>Eagle</i>	Capt. Swain	<i>Nancy</i>
1799	British sealing expedition Capt. Rhodes spent eight months examining and roughly charting east coast of Iles de Kerguelen while his crew were sealing and whaling	Robert Rhodes	<i>Hillsborough</i>
1799	United States sealing expedition (from New York) Wrecked in South Georgia in 1799; her cargo of 14,000 Fur Seal skins was salvaged and sold in 1800 to British sealer <i>Morse</i>	?	<i>Regulator</i>
1800	United States whaling and sealing expedition (from Nantucket) Reported "Swain's Island" in lat. 59° S., long. 100° W. (later disproved)	Capt. Swain	<i>Charles</i>
1800	British sealing expedition Visited South Georgia	?	<i>Morse</i>
1800-01	United States sealing and exploring expedition (from New York) Probably the most profitable sealing voyage ever made to South Georgia, where 57,000 Fur Seal skins were secured and taken direct to China	Edmund Fanning	<i>Aspasia</i> ²
1800-03	United States sealing expedition (from New Haven) Visited South Georgia for two seasons	Nathaniel Storer	<i>Sally</i>
1803-05	United States sealing expedition (from Nantucket) Probably the second sealer to land at Iles Crozet, in 1805	Jonathan Paddock	<i>Favorite</i>
1804?-05	United States whaling and sealing expedition (from Nantucket) Visited Iles Crozet in 1805	Peter Chase	<i>Criterion</i>

¹ Died at Iles de Kerguelen, February 1793; succeeded by Hezekiah Pinkham.

² Edmund Fanning records that, in addition to the *Aspasia*, there were sixteen other American and British vessels working South Georgia during this season.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1805-[07?]	United States sealing expedition (from New York) Visited and landed on Îles Crozet in 1805 (probably the first landing), ¹ and Prince Edward Islands	Henry Fanning	<i>Catharine</i>
1808	British whaling expedition (from London) These Enderby Brothers' vessels rediscovered Bouvetøya on 6 October, but did not land	James Lindsay Thomas Hopper	<i>Swan</i> <i>Otter</i>
1810	Australian sealing expedition (from Sydney) Searching for new sealing grounds, this vessel, owned by Campbell and Co., discovered Macquarie Island on 11 July 1810. Sealing gang under Miles Holding landed and ship returned to Sydney with news of the discovery, returning to the island in September ³	Frederick Hasselberg ²	<i>Perseverance</i>
1812	British sealing expedition (from Calcutta) Wrecked on Macquarie Island on 10 June; crew rescued by <i>Perseverance</i> on 11 October	Richard Siddons	<i>Campbell Macquarie</i>
1813-14	Australian sealing expedition (from Sydney) Visited Macquarie Island	James Kelly	<i>Mary and Sally</i>
1815-16	Australian sealing expedition (from Sydney) Left sealing gang at Macquarie Island in February 1815 and failed to return; survivors rescued by <i>Elizabeth and Mary</i> (Capt. James Miller) in April 1816	Phillip Goodenough	<i>Betsy</i>
1816-18	British sealing expedition Visited South Georgia	?	<i>Norfolk</i>
1818-19	British sealing expedition Visited South Georgia; also searched South Sandwich Islands for seals and made a landing there	?	<i>Norfolk</i>
1819	British trading voyage (from Buenos Aires to Valparaiso) Blown southwards off course, discovered South Shetland Islands on 18 February, but made no landing	William Smith	<i>Williams</i>

¹ Henry Fanning initiated the sealing business at Îles Crozet during this voyage.

² Hasselberg spelt his name in a number of different ways.

³ In September 1810 the "First Fleet" of six vessels left Sydney for Macquarie Island: *Aurora* (Capt. S. R. Chace), *Elizabeth and Mary* (Capt. Gordon), *Perseverance* (Capt. F. Hasselberg), *Star* (Capt. John Wilkinson), *Sydney Cove* and *Unity* (Capt. Daniel Cooper). Uncontrolled exploitation of the Fur Seals exhausted the stock in about ten years. From 1820 onwards sealing interests in Hobart began to compete with Sydney firms. Elephant sealing continued to be profitable until about 1884. Voyages to Macquarie Island after 1810-11 are listed here only when there is some special interest.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1819 ¹	British voyage (from Blyth to Valparaiso)	William Smith	<i>Williams</i>
	Revisited South Shetland Islands; landed on King George Island on 16 October and took possession for King George III		
1819	Spanish voyage (from Cadiz to Lima)	?	<i>San Telmo</i>
	<i>San Telmo</i> left Cadiz with <i>Alexandro</i> , <i>Prueba</i> and <i>Primeroso-Mariana</i> ; encountered very severe weather in Drake Passage; <i>San Telmo</i> , dismasted and rudderless, was taken in tow by <i>Primeroso-Mariana</i> , but hawsers parted and she was left to her fate on 4 September 1819 in about lat. 62° S. Some of her spars and her anchor-stock were found by sealers at Shirreff Cove on Livingston Island in 1820		
1819-20	British expedition (from Valparaiso)	Edward Bransfield	<i>Williams</i>
	Accompanied by William Smith, visited and roughly surveyed South Shetland Islands under instructions from Senior British Naval Officer, West Coast of South America; discovered the north-western coast of Graham Land (which he named "Trinity Land") on 30 January 1820; took possession of King George Island and Clarence Island for King George IV on 22 January and 4 February 1820, respectively. Bransfield was the first man to chart a portion of the Antarctic mainland		
1819-20	British sealing expedition	?	<i>Admiral</i>
	Visited South Georgia		
1819-20	Argentine sealing expedition	Carlos Tidblon [or Timblón?]	<i>San Juan Nepomuceno</i>
	First ship known to have taken Fur Seals in South Shetland Islands; reached Buenos Aires on 22 February 1820 with a cargo of 14,600 skins		
1819-20	British sealing expedition (from Buenos Aires)	?	<i>Espírito Santo</i>
	The first British sealing vessel known to have visited the South Shetland Islands		
1819-20	United States sealing expedition (from Stonington)	James P. Sheffield	<i>Hersilia</i>
	Searched unsuccessfully for mythical "Aurora Islands". Visited South Shetland Islands in January 1820, with N. B. Palmer as second mate and W. A. Fanning as supercargo; the first American sealing vessel known to have visited this area, taking 8868 skins from headquarters at Rugged Island, where she met <i>Espírito Santo</i>		
1819-20	United States sealing expedition (from Salem)	?	?
	Vessel owned by Mr White of Salem appears to have made an independent rediscovery of South Shetland Islands during this season, but no details of voyage have yet been traced		

¹ Following Smith's second visit to the South Shetland Islands in October 1819, several sealing vessels visited the group in January 1820. In the summer of 1820-21 there were at least 44 American and British vessels working in the South Shetland Islands, and in the summer of 1821-22 the number had increased to at least 91 vessels. As a result of uncontrolled slaughter, the Fur Seals had become almost extinct in the islands by the beginning of 1822. At the end of 1821 the more enterprising skippers began to search for new hunting grounds further south and east. It seems certain that the whole Bransfield Strait area, including the northern part of Trinity Peninsula, must have been seen by many sealers at this time. They were working in competition, and for the most part kept their discoveries to themselves.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1819-21	Russian expedition	Thaddeus Bellingshausen ¹ M. P. Lazarev	<i>Vostok</i> <i>Mirnyy</i>
Circumnavigated Antarctic continent in a high southern latitude; almost certainly sighted, but did not recognize as land, two coastal areas in Kron-prinsesse Märtha Kyst and Prinsesse Ragnhild Kyst (the first of these was on 28 January 1820, two days before Bransfield's discovery of Trinity Peninsula); surveyed South Shetland Islands; discovered Peter I Øy on 22 January 1821 and Alexander Land on 29 January 1821; extended Cook's survey of South Sandwich Islands and South Georgia; visited Macquarie Island			
1820	British sealing expedition (from Liverpool)	?	<i>Ann</i>
Visited South Shetland Islands; wrecked 30 (?) December 1820			
1820-21	United States sealing expedition (from Stonington)	Joseph Henfield Alexander B. Clark Jeremiah Holmes ?	<i>Catharina</i> <i>Clothier</i> <i>Emeline</i> <i>Spark</i>
Visited South Shetland Islands. <i>Clothier</i> was wrecked on 9 December 1820 at Clothier Harbour. The schooner <i>Spark</i> acted as tender to this fleet			
1820-21	British sealing expedition (from Liverpool)	Robert Fildes	<i>Cora</i>
Visited South Shetland Islands; wrecked on Desolation Island, 6 January 1821. Capt. Fildes prepared several charts and the first sailing directions for the islands. Capt. Fildes and part of crew taken home to Liverpool by <i>Indian</i>			
1820-21	British sealing expedition (from Liverpool)	Capt. McFarlane	<i>Dragon</i>
Visited South Shetland Islands. Reported to have landed on mainland coast south of Deception Island, but found no Fur Seals there			
1820-21	British sealing expedition (from London)	Capt. Powell	<i>Eliza</i>
Visited South Shetland Islands			
1820-21	United States sealing expedition (from Boston)	John G. Scott Edward Low	<i>Emerald</i> <i>Esther</i>
Visited South Shetland Islands; rescued crew of <i>Venus</i> , which had been wrecked on 7 March 1821			
1820-21	United States sealing expedition (from Stonington)	Benjamin Pendleton ¹ James P. Sheffield Nathaniel B. Palmer Thomas Dunbar Jr. Ephraim Williams	<i>Frederick</i> <i>Hersilia</i> <i>Hero</i> <i>Free Gift</i> <i>Express</i>
This fleet visited South Shetland Islands. N. B. Palmer, in shallop <i>Hero</i> , searching for new sealing grounds, reported land on 16 November 1820 which was later named "Palmer's Land" (now Palmer Coast of Graham Land); he probably also examined what is now known as Palmer Archipelago			
1820-21	United States sealing expedition (from Salem)	William B. Orne Nicholas Withen Benjamin Upton	<i>General Knox</i> <i>Governor Brooks</i> <i>Nancy</i>
Visited South Shetland Islands			

¹ Senior commander.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1820-21	British sealing expedition (from Liverpool) Visited South Shetland Islands; operated chiefly from Rugged Island; driven to sea, sustaining serious damage in gale on 2 January 1821, leaving ashore eight of crew who were rescued by <i>Indian</i>	Capt. Richards	<i>George</i>
1820-21	United States whaling and sealing expedition (from New Bedford) Visited South Shetland Islands	David Leslie	<i>Gleaner</i>
1820-21	British sealing expedition (from Liverpool) Visited South Shetland Islands; wrecked 25 December 1820	[Capt. Johnson?]	<i>Hannah</i>
1820-21	United States sealing expedition (from Nantucket) Visited South Shetland Islands; based at Harmony Cove, Nelson Island	Nathaniel Ray } ¹ Tristan Folger }	<i>Harmony</i> <i>William and Nancy</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Ralph Bond	<i>Hetty</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Capt. Weeks	<i>Horatio</i>
1820-21	British sealing expedition (from Liverpool) Visited South Shetland Islands; rescued some of crew of <i>Cora</i> and boat crew of <i>George</i> left behind during gale	Capt. Spiller	<i>Indian</i>
1820-21	British sealing expedition (from Leith) Visited South Shetland Islands	James Weddell ² ?	<i>Jane</i> <i>Beaufoy</i>
1820-21	United States sealing expedition (from New York) This fleet, organized by James Byers, visited South Shetland Islands and was based first at Rugged Island, later in Yankee Harbour. Capt. Johnson, in the shallop <i>Sarah</i> , searched south-westwards to about lat. 66° S., long. 70° W. for new sealing grounds, finding "plenty of land but no seal". Donald MacKay of <i>Sarah</i> and B. Astor of <i>Jane Maria</i> collected rock specimens for New York Lyceum of Natural History (now American Museum of Natural History). Hampton Stewart of <i>Jane Maria</i> made a chart (now lost) of South Shetland Islands	Robert Johnson ² Robert Macy Charles H. Barnard Benjamin J. Brunow Donald MacKay	<i>Jane Maria</i> <i>Aurora</i> <i>Charity</i> <i>Henry</i> <i>Sarah</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands ³	John Walker	<i>John</i>

¹ Sailed in company.² Senior commander.³ Capt. Walker reported 30 American vessels sealing in South Shetland Islands in 1820-21 season.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1820-21	British sealing expedition (from Liverpool) Visited South Shetland Islands; first vessel to anchor in Potter Cove	J. Roberts	<i>King George</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	?	<i>Lady Francis</i>
1820-21	British sealing expedition (from Liverpool) Wrecked off Cape Melville on King George Island on 25 December 1820; the master occupied his time until relieved making an inaccurate but historically interesting map of central South Shetland Islands	Richard Sherratt	<i>Lady Trowbridge</i>
1820-21	British sealing expedition (from London) The chief officer and ten of the crew made the first involuntary wintering in the Antarctic on King George Island, South Shetland Islands, in 1821	Capt. Clark	<i>Lord Melville</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Capt. Wetherell	<i>Mercury</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Capt. Binn	<i>Minerva</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Capt. MacGregor	<i>Minstrel</i>
1820-21	British sealing expedition (from London?) Visited South Shetland Islands in 1820-21 [left England December 1818; returned to London July 1821]	Capt. Burney	<i>Nelson</i>
1820-21	United States sealing expedition (from Boston) Visited South Shetland Islands, based on Potter Cove, King George Island. <i>O'Cain</i> took home some of crew of <i>Clothier</i> , which had been wrecked on 9 December 1820	Jonathan Winship Joseph Adams	<i>O'Cain</i> <i>Stranger</i>
1820-21	British sealing expedition (from Liverpool) Visited South Shetland Islands	Capt. Hodges	<i>Salisbury</i>
1820-21	United States sealing expedition (from Nantucket) Visited South Shetland Islands	Capt. Inott	<i>Samuel</i>
1820-21	British sealing expedition (from London) Visited South Shetland Islands	Capt. Fraser	<i>Sprightly</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1820-21	United States sealing expedition (from New York) Visited South Shetland Islands, where wrecked on 7 March 1821; crew rescued by <i>Emerald</i> and <i>Esther</i>	William Napier	<i>Venus</i>
1820-21	British sealing expedition (from Blyth) Visited South Shetland Islands with two vessels	William Smith ?	<i>Williams</i> ?
1820-22 ¹	Australian sealing expedition (from Sydney) Visited South Shetland Islands	Richard Siddons	<i>Lynx</i>
1820-22	United States sealing expedition (<i>Huron</i> from New Haven and <i>Huntress</i> from Nantucket) Visited South Shetland Islands; sealing based on Yankee Harbour. Capt. Davis in shallop <i>Cecilia</i> cruised round islands in January 1821 searching for new sealing grounds; transported crew of wrecked British sealer (probably, <i>Lady Trowbridge</i> ?) from King George Island to Rugged Island. In February, 1821 Capt. Davis and Capt. Burdick, in separate cruises, took <i>Cecilia</i> to Hughes Bay area, where Capt. Davis made what appears to be first recorded landing on mainland of Antarctica; reported large stretch of coast but no new sealing grounds	John Davis Christopher Burdick ²	<i>Huron</i> <i>Huntress</i> <i>Cecilia</i> ³
1820-22	British sealing expedition (from London) Sealing at Prince Edward Islands; wrecked on 18 February 1821 at Ile Crozet; the crew were rescued by United States vessel <i>Philo</i> (Capt. Isaac Percival) on 21 January 1822	William Veale	<i>Princess of Wales</i>
1821-22	British sealing expedition (from Liverpool) Visited South Shetland Islands; moored at New Plymouth for season. Visited South Georgia, March 1822	J. Kitchen	<i>Ann</i>
1821-22	British sealing expedition (from London) Visited South Shetland Islands; anchored in Clothier Harbour for season	Capt. Greaves	<i>Bruss</i> [or <i>Brulson</i> ?]
1821-22	British sealing expedition (from Liverpool) Visited South Shetland Islands. Reported to have discovered a safe anchorage on mainland coast south of Deception Island, reaching Nantucket in June.	J. Usher	<i>Caraque</i>
1821-22	Australian sealing expedition (from Hobart) Visited South Shetland Islands	D. Taylor	<i>Caroline</i>

¹ *Lynx* wintered at Falkland Islands in 1821.

² Sailed in company for first season. *Huntress* sailed from South Shetland Islands for Patagonia in March 1821. *Huron* and *Cecilia* wintered at Falkland Islands in 1821 and returned to South Shetland Islands for 1821-22 season.

³ Name *Young Huron* also used.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1821-22	United States sealing expedition (from New York) Visited South Shetland Islands	Charles H. Barnard	<i>Charity</i>
1821-22	British sealing expedition (from London) Powell, in <i>Dove</i> , visited and resurveyed north coast of South Shetland Islands; later published a very fine chart of the group, basing the south coast on information from other sealers; discovered and charted South Orkney Islands with N. B. Palmer on 6 December 1821, and made first chart of this group; Powell took possession of Coronation Island for King George IV on 7 December 1821. <i>Eliza</i> moored in Desolation Harbour and afterwards Clothier Harbour for season	George Powell ?	<i>Dove</i> <i>Eliza</i>
1821-22	[British?] sealing expedition Reported "Emerald Island", in December 1821, in lat. 57° 30' S., long. 162° 12' E. (later disproved)	C. J. Nockells	<i>Emerald</i>
1821-22	British sealing expedition (from Plymouth) Visited South Shetland Islands	[Ralph?] Bond	<i>Enchantress</i>
1821-22	United States sealing expedition (from Stonington)	Benjamin Pendleton ¹ Thomas Dunbar Nathaniel B. Palmer William A. Fanning Benjamin Cutler Harris Pendleton Capt. Chester	<i>Frederick</i> <i>Express</i> <i>James Monroe</i> <i>Alabama Packet</i> <i>Free Gift</i> <i>Hero</i> <i>Essex</i>
	This fleet visited South Shetland Islands. N. B. Palmer, in <i>James Monroe</i> , joined George Powell in <i>Dove</i> for voyage to discover South Orkney Islands in December 1821		
1821-22	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Sayer	<i>General Scott</i>
1821-22	British sealing expedition Visited South Shetland Islands; based on Clothier Harbour for season	Capt. Alexander	<i>George IV</i>
1821-22	United States sealing expedition (from Nantucket) Visited South Shetland Islands	Prince B. Moores	<i>George Porter</i>
1821-22	British sealing expedition (from Plymouth) Visited South Shetland Islands; moored at New Plymouth for season	Capt. Rowe	<i>Grace</i>
1821-22	United States sealing expedition (from Nantucket) Visited South Shetland Islands	Isaac Hodges	<i>Harmony</i>
1821-22	British sealing expedition Visited South Shetland Islands ²	Capt. Kellick	<i>Henry</i>

¹ Senior commander.² Capt. Kellick reported about 20 sail of Americans in South Shetland Islands in 1821-22 season.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1821-22	United States sealing expedition (from New Haven) Visited South Shetland Islands	John Davis ?	<i>Huron</i> <i>Cecilia</i>
1821-22	British sealing expedition (from Leith) Visited South Georgia and South Shetland Islands; Michael McLeod re-discovered South Orkney Islands independently in December 1821, six days later than Powell and Palmer; Weddell visited and named South Orkney Islands in February 1822	James Weddell Michael McLeod	<i>Jane</i> <i>Beaufoy</i>
1821-22	United States sealing expedition (from New York) Visited South Shetland Islands. Benjamin Morrell was first mate on <i>Wasp</i>	Abraham Blauvelt Robert Johnson	<i>Jane Maria</i> } ¹ <i>Wasp</i> }
1821-22	British sealing expedition (from London) Visited South Shetland Islands	John Walker	<i>John</i>
1821-22	British sealing expedition (from Liverpool) Visited South Shetland Islands and South Georgia	Capt. Roberts	<i>King George</i>
1821-22	British sealing expedition (from London) Visited South Shetland Islands	?	<i>Livonia</i>
1821-22	British sealing expedition (from Newcastle) Visited South Shetland Islands; anchored at Clothier Harbour for most of season. <i>Mellona</i> also anchored at Shirreff Cove, and narrowly escaped wreck on Desolation Island, 25 March 1822	Capt. [Thos.?] Johnson Capt. Peacock	<i>Mellona</i> <i>Liberty</i>
1821-22	United States sealing expedition (from Salem) Visited South Shetland Islands; anchored in Clothier Harbour for season	Benjamin Upton	<i>Nancy</i>
1821-22	British sealing expedition (from Calcutta) Visited South Shetland Islands; moored in "Johnson's Dock", Livingston Island	Capt. M'Kean	<i>Princess Charlotte</i>
1821-22	British sealing expedition (from Liverpool) Visited South Shetland Islands; moored in Clothier Harbour for most of season	Robert Fildes	<i>Robert</i>
1821-22	British sealing expedition (from London?) Visited South Shetland Islands; moored in Clothier Harbour in March 1822	?	<i>Romeo</i>
1821-22	British sealing expedition (from London) Visited South Shetland Islands; moored in New Plymouth for season	Capt. Brown	<i>Sprightly</i>

¹ The two vessels sailed separately but returned in company.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1821-22	British sealing expedition (from London) Visited South Georgia and South Shetland Islands. At Bahia on 15 April 1822 Capt. Pottinger deposed that 7 of his crew with 12 others took <i>Tartar's</i> launch and proceeded to sea, presumably with piratical intent	Capt. Pottinger	<i>Tartar</i>
1821-23	British sealing expedition (from London) Visited South Shetland Islands	[Ralph?] Bond	<i>Martha</i>
1821-23	British sealing expedition (from London?) Visited South Shetland Islands	Capt. Burney	<i>Nelson</i>
1821-23	British sealing expedition (from London) Visited South Shetland Islands	Capt. Robinson	<i>Pomona</i>
1822	British voyage (Hobart to London) Called at Macquarie Island in February for cargo and made a sketch survey of the island	W. Langdon	<i>Lusitania</i>
?-1823	British sealing expedition (from London) Visited South Shetland Islands	Capt. Duell	<i>Dart</i>
1822-23	United States sealing expedition (from New York) Searched unsuccessfully for "Aurora Islands". Visited South Georgia, Bouvetøya (where the first landing was made), Iles de Kerguelen, and South Sandwich Islands. Probably penetrated to lat. 70° 14' S. in Weddell Sea, and reported land, "New South Greenland", in approx. long. 48° W., between lats. 62° S. and 69° S. (since disproved)	Robert Johnson Benjamin Morrell	<i>Henry</i> <i>Wasp</i>
1822?-23	British sealing expedition (from Isle of Wight) <i>Jenny</i> was found drifting in Drake Passage by whaler <i>Hope</i> (Capt. Brighton) in September 1840; crew were all dead and log entered up to 17 January 1823	?	<i>Jenny</i>
1822-23	British sealing expedition (from London) Visited South Shetland Islands	Capt. Alexander	<i>King George</i>
1822-24	British sealing expedition (from Leith) Roughly charted south side of South Orkney Islands, the work being carried out by Matthew Brisbane, in <i>Beaufoy</i> ; Weddell made an independent chart of South Shetland Islands and Weddell Sea, into which he penetrated southwards to lat. 74° 15' S., long. 34° 16' W.; visited South Georgia	James Weddell ¹ Matthew Brisbane	<i>Jane</i> <i>Beaufoy</i>
1823-25	British sealing expedition (from London) Visited South Shetland Islands	Capt. Brown	<i>Susanna Ann</i>

¹ Senior commander.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1824-25	Australian sealing expedition (from Hobart) Wrecked on Macquarie Island on 17 March 1825; crew rescued by <i>Wellington</i> in August 1825	D. Taylor	<i>Caroline</i>
1824-25	British sealing expedition (from London) Visited South Shetland Islands; survey of Hughes Bay, west Graham Land, made by James Hoseason, first mate	Edward Hughes	<i>Sprightly</i>
1824-26	British sealing expedition (from Leith) Visited South Shetland Islands	Matthew Brisbane	<i>Beaufoy</i>
1825	Australian relief expedition (from Hobart) This chartered vessel was sent to Macquarie Island to search for missing <i>Caroline</i> (already rescued by <i>Wellington</i>). <i>Cyprus</i> brought back a prisoner who had lived on Macquarie Island for three years	Geo. K. Todd	<i>Cyprus</i>
1825	"Van Diemen's Land" (now Tasmania) made a separate colony by British Government, and Macquarie Island included within its jurisdiction		
1825-26	French sealing expedition (from Nantes) Visited Iles de Kerguelen	?	<i>Emilie</i>
1825-26	British sealing expedition (from London) These Enderby Brothers' vessels rediscovered Bouvetøya on 10 December 1825, named it "Liverpool Island" and took possession for King George IV on 16 December 1825. Reported "Thompson Island" near Bouvetøya (later disproved)	George Norris ¹ ?	<i>Sprightly</i> <i>Lively</i>
1825-26	United States sealing expedition (from Sag Harbor, N.Y.) Visited Iles de Kerguelen	James Griffin	<i>Union</i>
1825-29	British sealing expedition The two shallops of this expedition were wrecked at Iles de Kerguelen. John Nunn, one of the sealers, wrote detailed account of islands and of privations of crew during three years' residence	Alexander Sinclair	<i>Royal Sovereign</i>
1827-29	United States sealing expedition (from Stonington) Visited Prince Edward Islands in 1829	Benjamin S. Cutler	<i>Uxor</i>
1828	[Nationality?] voyage (from Port Jackson to Rio de Janeiro) Reported "Nimrod Islands" in lat. 56° S., long. 158° 30' W. (later disproved but not finally removed from Admiralty charts until 1935)	Henry Eilbech	<i>Nimrod</i>

¹ Senior commander.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1828-31	British expedition Visited South Shetland Islands to make pendulum and magnetic observations at Deception Island, which was charted; took possession of Hoseason Island for King George IV on 7 January 1829; roughly charted part of Palmer Coast	Henry Foster	H.M.S. <i>Chanticleer</i>
1829-31	United States sealing expedition (from New London) Visited South Georgia (where Fur Seals were becoming scarce), and northern South Sandwich Islands, landing on Zavodovski Island	James Brown	<i>Pacific</i>
1829-31	United States expedition (from New York) Visited South Shetland Islands in January-February 1830; the first government-sponsored United States Antarctic exploring expedition, accompanied by independent investigators (James Eights, J. N. Reynolds and A. J. Watson). <i>Annawan</i> and <i>Penguin</i> searched unsuccessfully for mythical "Swain's Island". <i>Seraph</i> penetrated westwards to long. 101° W., south of lat. 60° S	Benjamin Pendleton ¹ Nathaniel B. Palmer Alexander S. Palmer	<i>Seraph</i> <i>Annawan</i> <i>Penguin</i>
1830-32	British expedition (from London) These vessels, sent out by Enderby Brothers, circumnavigated Antarctic continent; visited South Sandwich Islands; discovered Enderby Land on 28 February, 1831, Adelaide Island on 15 February 1832, and northern Biscoe Islands; discovered and annexed land on 21 February 1832 for King William IV, calling it Graham Land (in reality a southern extension of Bransfield's "Trinity Land", and "Palmer's Land"); visited South Shetland Islands	John Biscoe ¹ — Avery	<i>Tula</i> <i>Lively</i>
1831	Australian sealing and whaling expedition (from Hobart) Sealing and whaling voyage to Macquarie Island; penetrated to lat. 72° S., the furthest south reached at that date in Ross Sea	Samuel Harvey	<i>Venus</i>
1831-33	United States sealing expedition (from Stonington) Visited South Shetland Islands	Alexander S. Palmer Capt. Barnard	<i>Charles Adams</i> <i>Courier</i>
1832-34	British sealing expedition Visited Prince Edward Islands and Iles de Kerguelen, where vessel was wrecked; Richard Harris made observations on birds	?	?
1833-34	British expedition (from London) These two Enderby Brothers' ships sailed to continue John Biscoe's researches, but did not get beyond lat. 60° S., long. 53° W., where <i>Rose</i> was crushed in pack ice; her crew were rescued by <i>Hopeful</i> and the voyage abandoned	Henry Rea ² Capt. Mallows	<i>Hopeful</i> <i>Rose</i>
1833-34	British expedition (from London) Visited Iles de Kerguelen; discovered Heard Island on 27 November 1833 and Kemp Land on 26 December 1833	Peter Kemp	<i>Magnet</i>

¹ Senior commander.

² Capt. Prior commanded *Hopeful* until expedition reached Falkland Islands, when he resigned in favour of Capt. Rea.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1837-[38?]	United States sealing expedition (from Mystic, Conn.) Visited Iles Crozet, where both vessels wrecked in 1837 or 1838	Capt. Bailey ?	<i>Atlas</i> <i>Colossus</i>
1837-39	French expedition Voyage to protect French whaling interests. Visited Prince Edward Islands and Iles Crozet, landing on and surveying latter group	M. Cécille	<i>Héroïne</i>
1837-40	French expedition Visited and surveyed South Orkney Islands, South Shetland Islands, north-west coast of Trinity Peninsula, Orléans Channel and Joinville Island. Discovered Terre Adélie and took possession for France on 22 January 1840; independently discovered "Côte Clarie" (now Wilkes Coast) on 31 January 1840, a few hours later than Wilkes (<i>see below</i>)	J.-S.-C. Dumont d'Urville ¹ C. H. Jacquinot	<i>Astrolabe</i> <i>Zélée</i>
1838-39	British expedition (from London) These Enderby Brothers' ships discovered Balleny Islands on 9 February 1839; reported "appearance of land" east of what is now known as Sabrina Coast	John Balleny ¹ H. Freeman	<i>Eliza Scott</i> <i>Sabrina</i>
1838-39	United States sealing expedition (from Mystic, Conn.) Visited Iles Crozet	G. Pendleton	<i>Tampico</i>
1838-42	United States Exploring Expedition Squadron divided off Tierra del Fuego in February 1839: one group went south and east to South Shetland Islands and Trinity Peninsula; the other sailed south-west to a point off Thurston Peninsula, without sighting land. Following work in Pacific, ships returned to Antarctic in December 1839, sailing west along coast of Wilkes Land, discovering and charting a series of landfalls and "appearances of land" between longs. 160° E. and 98° E. Visited Macquarie Island	Charles Wilkes ¹ William L. Hudson Cadwalader Ringgold Robert E. Johnson ² William M. Walker ³	<i>Vincennes</i> <i>Peacock</i> <i>Porpoise</i> <i>Sea Gull</i> <i>Flying Fish</i>
1839-40	United States sealing expedition (from Stonington) Visited Iles Crozet	Gurdon Pendleton	<i>Henry</i>
1839-40	United States sealing expedition Visited Iles Crozet and Iles de Kerguelen	Isaac Burrows	<i>Rebecca Groves</i>
1839-40	United States sealing expedition (from Stonington) Visited Iles Crozet	Capt. Barnum	<i>Somerset</i>
1839-40	United States sealing expedition Visited Iles Crozet	G. Pendleton	<i>Tampico</i>

¹ Senior commander.² For first Antarctic cruise only. *Sea Gull* was lost off Cabo de Hornos in Spring of 1839.³ R. F. Pinkney commanded *Flying Fish* for second Antarctic cruise.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1839-40	United States sealing expedition (from Mystic, Conn.) Visited Prince Edward Islands	Joseph B. Mitchell	<i>Uxor</i>
1839-41	United States sealing expedition (from Stonington) Visited Iles Crozet	Capt. Brewster	<i>Philetus</i>
1839-43	British expedition	James Clark Ross ¹ Francis R. M. Crozier	H.M.S. <i>Erebus</i> H.M.S. <i>Terror</i>
Circumnavigated Antarctic continent; the first ships to force a way through the pack ice of Ross Sea; discovered and roughly charted 500 miles of new coastline in Victoria Land which was claimed for British Crown at Possession Island on 12 January and Franklin Island on 27 January 1841; discovered Ross Island and Ross Ice Front; sighted Joinville Island; discovered James Ross Island group and annexed these lands for the British Crown at Cockburn Island on 6 January 1843; searched unsuccessfully for Bouvetøya; visited Prince Edward Islands, Iles Crozet and Iles de Kerguelen; sighted Balleny Islands			
1841	British whaling expedition (from St John's, Newfoundland) Reported "Dougherty's Island" (<i>alias</i> "Swain's Island"?) in lat. 59° S., long. 120° W., in May 1841 (later disproved)	Capt. Dougherty	<i>James Stewart</i>
1841	United States sealing expedition (from Mystic, Conn.) Wrecked at Iles Crozet, 28 October 1841	Capt. Stephens	<i>Uxor</i>
1841-42	United States whaling and sealing expedition (from Bridgeport, Conn.) Visited Iles Crozet	Capt. Howell	<i>Atlantic</i>
1841-42	United States sealing expedition (from Newport, Rhode Island) Visited South Shetland Islands and Palmer Archipelago; recovered minimum thermometer left at Deception Island by Foster in 1829	William H. Smyley	<i>Ohio</i>
1841-43	United States whaling and sealing expedition (from Greenport, N.Y.) Visited Iles Crozet	Capt. Fordham	<i>Bayard</i>
1841-43	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Royce	<i>Crescent</i>
1841-43	United States whaling and sealing expedition (from Bridgeport, Conn.) Visited Iles Crozet	Capt. Bishop	<i>Hamilton</i>

¹ Senior commander.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1841-43	United States whaling and sealing expedi- tion (from Stonington) Visited Iles Crozet	Capt. Brewster	<i>Herald</i>
1841-43	United States whaling and sealing expedition (from Mystic, Conn.) Visited Iles Crozet	Capt. Bailey	<i>Leander</i>
1841-43	United States whaling and sealing expedition (from New London) Visited Iles Crozet	Capt. Prentiss	<i>Palladium</i>
1841-43	United States whaling and sealing expedition (from New London) Visited Iles Crozet	Capt. Brown	<i>Peruvian</i>
1841-43	United States whaling and sealing expedi- tion (from New York) Visited Iles Crozet	Capt. Slate	<i>Sabina</i>
1841-44	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Babcock	<i>Arabella</i>
1841-44	United States whaling and sealing expedi- tion (from Stonington) Visited Iles Crozet	Capt. Pendleton	<i>Newark</i>
1842-43	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Cooper	<i>American</i>
1842-43	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Worth	<i>Gem</i>
1842-43	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Bennett } ¹ Capt. Paine }	<i>Hannibal</i> <i>Portland</i>
1842-44	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Paine	<i>Alciope</i>

¹ Sailed in company.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1842-44	United States sealing expedition (from New London) Visited Prince Edward Islands and Iles Crozet	Gurdon L. Allyn	<i>Franklin</i>
1842-44	United States whaling and sealing expedition (from New London) Visited Iles Crozet	Capt. Chester	<i>Tenedos</i>
1842-44	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Eldridge	<i>Timor</i>
1842-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Bennett	<i>Henry Lee</i>
1842-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Rogers	<i>John Jay</i>
1842-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Godbey	<i>Tuscany</i>
1843	British Letters Patent of 23 June provided for government of Falkland Islands and their Dependencies (revised on 28 April 1876, 25 February 1892, and 21 July 1908 (<i>q.v.</i>))		
1843-44	United States whaling and sealing expedition (from Stonington) Visited Iles Crozet	Capt. Barnum	<i>United States</i>
1843-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Havens	<i>American</i>
1843-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Smith	<i>Cadmus</i>
1843-45	United States whaling and sealing expedition (from Greenport, N.Y.) Visited Iles Crozet	Capt. Weeks	<i>Delta</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1843-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Worth	<i>Gem</i>
1843-45	United States whaling and sealing expedition (from Stonington) Visited Iles Crozet	Capt. Morgan	<i>Herald</i>
1843-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Shearman	<i>Marcus</i>
1843-45	United States whaling and sealing expedition (from Stonington) Visited South Shetland Islands, where wrecked in February 1845	Capt. Peck	<i>Richard Henry</i>
1843-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Rogers	<i>Romulus</i>
1844-45	United States whaling and sealing expedition (from Stonington) Visited Iles Crozet	Capt. Barber	<i>Bolton</i>
1844-45	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen ¹	Thomas Long [Capt. Marks?]	<i>Charles Carroll Garland</i>
1844-45	United States whaling and sealing expedition (from New Suffolk, N.Y.) Visited Iles Crozet	Capt. Payne	<i>Gentleman</i>
1844-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Babcock	<i>Hamilton</i>
1844-45	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet. Returned early owing to mutiny of crew	Capt. Ludlow	<i>Oscar</i>

¹ This voyage appears to mark the beginning of the United States sealing business at Iles de Kerguelen, although a number of British and United States vessels had previously obtained cargoes of oil and skins at these islands. New London sealers virtually had a monopoly there for the next 30 years.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1844-45	British expedition Searched unsuccessfully for Bouvetøya and made important magnetic observations in South Atlantic Ocean and South Indian Ocean	T. E. L. Moore	H.M. hired barque <i>Pagoda</i>
1844-46	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. French	<i>Barbara</i>
1844-46	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Bolls	<i>Exile</i>
1844-46	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Stroud	<i>Franklin</i>
1844-46	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Fowler	<i>Nimrod</i>
1844-47	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen. Lost while homeward bound on 23 May 1847	Capt. Butler	<i>Hand</i>
1844-47	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen, where lost with all hands in 1847	Capt. Carr	<i>Shaw Perkins</i>
1844-?	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Mitchell	<i>Fame</i>
1845-47	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Thomas Long	<i>Charles Carroll</i>
1845-47	United States whaling and sealing expedition (from Mystic, Conn.) Visited Iles Crozet	Capt. Brereton	<i>Leander</i>
1846-48	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church } ¹ Capt. Morgan }	<i>Exile</i> <i>Jason</i>

¹ Sailed in company.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1846-48	United States whaling and sealing expedition (from Sag Harbor, N.Y.) Visited Iles Crozet	Capt. Jennings	<i>Nimrod</i>
1847-49	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen. Capt. Long independently rediscovered Heard Island. The tender <i>Gurland</i> , which sailed to Iles de Kerguelen in 1844, was wrecked there in 1848	Thomas Long Capt. Marks	<i>Charles Carroll</i> <i>Garland</i>
1847-49	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Slate Capt. Lyon	<i>Corinthian</i> <i>Atlas</i>
1847-49	United States whaling and sealing expedition (from Mystic, Conn.) Visited Iles Crozet	Capt. Maginly	<i>Coriolanus</i>
1847-49	United States whaling and sealing expedition (from New London) Visited Iles Crozet	Capt. Norie	<i>Franklin</i>
1847-50	United States whaling and sealing expedition (from Mystic, Conn.) Visited Iles Crozet	Capt. Brereton	<i>Leander</i>
1848-52	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen. [<i>Peruvian</i> returned to New London in 1850]	William R. Brown Lucius D. Butler	<i>Peruvian</i> <i>Exile</i>
1849	British voyage Emigrant ship, on passage from England to New Zealand, wrecked on Prince Edward Island on 19 June; 11 survivors out of complement of 63 were rescued by Cape Town sealer <i>Courier</i> (Capt. Wingfield) on 2 September	Samuel Potter	<i>Richard Dar</i>
1849-51	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Lyon	<i>Atlas</i>
1849-51	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Slate Capt. Norie Ebenezer Morgan	<i>Corinthian</i> <i>Franklin</i> <i>Julius Caesar</i>
1849-51	United States whaling and sealing expedition (from Stonington) Visited Iles Crozet	Capt. Barnum	<i>United States</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1850	British whaling expedition Sighted Balleny Islands and sailed westwards to long. 143° E., in a higher latitude than Wilkes in 1839, without seeing land	Capt. Tapsell	<i>Brisk</i>
1850-52	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	William R. Brown	<i>Peruvian</i>
1851-53	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Erasmus Darwin Rogers	<i>Corinthian</i>
1851-53	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen. [John E. Smith returned in 1854]	Ebenezer Morgan Daniel S. Babcock Simeon Church	<i>Julius Caesar</i> <i>John E. Smith</i> <i>Marcia</i>
1852-53	United States whaling and sealing expedition (from Mystic, Conn.) Visited South Shetland Islands	Capt. Eldridge Capt. Clark	<i>Aeronaut</i> <i>Lion</i>
1852-53	United States sealing expedition (from Stonington) Visited South Shetland Islands	Capt. Pendleton	<i>Sarah E. Spear</i>
1852-54	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Brown	<i>Hannah Brewer</i>
1852-54	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Rice	<i>Iris</i>
1852-54	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Morgan	<i>Peruvian</i>
1852-54	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Anthony	<i>Topaz</i>
1853-54	United States sealing expedition (from Mystic, Conn.) Visited South Shetland Islands. 1854	Capt. Eldridge G. H. Buckmaster Capt. Gilderdale <i>Lion</i> was lost on English Bank, 22 March	<i>Aeronaut</i> <i>Lion</i> <i>Wilmington</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1853-54	United States sealing expedition (from Stonington) Visited South Shetland Islands	Capt. Hidden	<i>Flying Cloud</i>
1853-54	United States voyage (from Boston to Melbourne) Independently rediscovered Heard Island in November 1853	John J. Heard	<i>Oriental</i>
1853-54	British voyage Independently rediscovered Heard and McDonald Islands in January 1854	W. McDonald	<i>Samarang</i>
1853-54	United States sealing expedition (from Stonington) Visited South Shetland Islands	Capt. Kane	<i>Sarah E. Spear</i>
1853-54	United States sealing expedition (from Stonington) Visited South Shetland Islands	Capt. Wilcox	<i>United States</i>
1853-56	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Alert</i>
1853-56	United States whaling and sealing expedition (from New London)	Erasmus Darwin Rogers Franklin F. Smith Henry Whipple Capt. Butler Henry S. Williams Capt. Edwards	<i>Corinthian</i> ¹ <i>Laurens</i> <i>Atlas</i> <i>Exile</i> <i>Franklin</i> <i>Mechanic</i>
Visited Iles de Kerguelen. Following report of Capt. Heard's discovery in 1853, Capt. Rogers made first landing on Heard Island in January 1855. His report to his agents, Messrs Perkins and Smith of New London, Conn., induced them in September 1855 to send out Capt. Smith in the <i>Laurens</i> to join the <i>Corinthian</i> and her four tenders. Together they made the first map of Heard Island (now lost) and secured full cargoes of skins and oil			
1853-56	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Babcock	<i>Julius Caesar</i>
1853-56	United States sealing expedition (from New London) Visited Iles de Kerguelen	Simeon Church	<i>Marcia</i>
1854	In December the English ships <i>Earl of Eglinton</i> (Capt. James S. Hutton), <i>Herald of the Morning</i> (Capt. John Attwaye) and <i>Lincluden Castle</i> (Capt. Rees) each independently rediscovered Heard and McDonald Islands while using the great-circle route on voyages round Cape of Good Hope and Australia to China. Not realizing that the islands were already known, they each renamed them		

¹ This voyage initiated the United States sealing business at Heard Island, which was frequently visited from 1857 onwards. Heard Island and Iles de Kerguelen were usually worked together. The tenders *Atlas* and *Franklin* had sailed from New London for Iles de Kerguelen in 1851 and returned to New London in 1856; *Exile* sailed in 1852 and returned in 1859; *Mechanic* sailed in 1853; *Laurens* returned in 1857.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1854-57	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen. Condemned at St Helena, February 1857, during homeward voyage	Capt. Smith	<i>Hannah Brewer</i>
1855-57	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Morgan	<i>Pioneer</i>
1855-57	United States sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Royce	<i>Zoe</i>
1856-58	United States sealing expedition (from Fairhaven, Mass.) Visited Iles de Kerguelen and Heard Island. <i>Samuel Robertson</i> was the first ship from Fairhaven at Heard Island. She returned in 1858. <i>Alfred</i> , her tender, was wrecked at Heard Island, 29 December 1856, and was replaced by <i>Oxford</i> , which sailed in 1857 and returned in 1860	Daniel S. Babcock Lucius L. Butler Capt. Mayhew	<i>Samuel Robertson</i> <i>Alfred</i> <i>Oxford</i>
1856-57	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Brown	<i>Atlantic</i>
1856-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Alert</i>
1856-58	United States sealing expedition (from New London) Visited Iles de Kerguelen, where wrecked in 1858	Capt. Starr	<i>Atlas</i>
1856-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island. Lost during return voyage on 10 August 1858	Erasmus Darwin Rogers	<i>Corinthian</i>
1856-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Kimball	<i>E. R. Sawyer</i>
1856-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Norie	<i>Isaac Hicks</i>
1856-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Ward	<i>Pacific</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1856-60	United States whaling and sealing expedition (from New London) Visited South Shetland Islands	Capt. King	<i>Tenedos</i>
1857	The German vessel <i>La Rochelle</i> (Capt. J. Meyer) passed close to Heard and McDonald Islands, and, not realizing that they had already been discovered, named them "König Max-Inseln"		
1857	South African sealing expedition (from Cape Town) One of John Jeary's sealing vessels, wrecked on Prince Edward Island on 17 May; rescued by Cape Town brig <i>Flora</i> (Capt. Dodds) on 6 December	Capt. Hamilton	<i>Maria</i>
1857-58	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Rathbone	<i>Atlantic</i>
1857-58	United States sealing expedition (from Mystic, Conn.) Visited Heard Island	Capt. Eldridge	<i>Cornelia</i>
1857-58	United States sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Morgan	<i>Laurens</i>
1857-59	United States sealing expedition (from Nantucket) Visited Iles de Kerguelen	Israel Morey W. T. Swain	<i>Catawba</i> <i>Eliza Jane</i>
1857-59	United States sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island, sending home a chart of the latter	Capt. Brown	<i>Pioneer</i>
1857-59	United States sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island. Capt. Henry Rogers with a sealing gang of 25 men wintered on Heard Island in 1857, the first party to do so ¹	James H. Rogers Capt. Smith	<i>Zoe</i> <i>J. E. Comstock</i>
1857-?	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Jerome	<i>R. B. Coleman</i>
1857-61	United States whaling and sealing expedition (from Warren, Rhode Island) Visited Iles de Kerguelen	George Taber	<i>William Wilson</i>
1858-59	United States sealing expedition (from Warren, Rhode Island) Visited Heard Island. Wrecked on coast of Patagonia, 1859	Capt. Norie	<i>Dolphin</i>

¹ This sealing gang may have been left during *Zoe's* previous voyage of 1855-57.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1858-59	Australian sealing expedition (from Hobart)	? Capt. Robinson	<i>Elizabeth Jane</i> <i>Offley</i>
1858-59	United States sealing expedition (from Mystic, Conn.) Visited Iles de Kerguelen and Heard Island; at latter, ship struck an iceberg and was lost in February 1859; crew saved	Capt. Chester	<i>Frank</i>
1858-59	United States whaling and sealing expedition (from New London) Visited Heard Island, where wrecked on 21 October 1859	Capt. Nash	<i>Mary Powell</i>
1858-59	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Billings	<i>Silver Cloud</i>
1858-60	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Parsons	<i>Alert</i>
1858-60	United States whaling and sealing expedition (from Mystic, Conn.) Visited Heard Island	Capt. Buddington	<i>Cornelia</i>
1858-60	United States whaling and sealing expedition (from New London) Visited Heard Island	[Henry?] Whipple	<i>E. R. Sawyer</i>
1858-60	United States sealing expedition (from Mystic, Conn.) Visited Iles de Kerguelen	Capt. Turner	<i>Romulus</i>
1858-61	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Bolles	<i>Isaac Hicks</i>
1858-61	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Smith	<i>Pacific</i>
1859-60	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island; wrecked at latter in 1860	Alexander Tillinghast	<i>Exile</i>
1859-61	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Smith	<i>Dove</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1859-62	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Franklin</i>
1859-?	United States sealing expedition (from New London) Visited Heard Island	?	<i>R. B. Coleman</i>
1860-62	United States whaling and sealing expedition (from New London) Visited Heard Island. [<i>Atlantic</i> returned in 1861]	Capt. Parsons ?	<i>Alert Atlantic</i>
1860-62	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Nash	<i>Charles Colgate</i>
1860-62	United States whaling and sealing expedition (from Mystic, Conn.) Visited Heard Island. Capt. Chester made a sketch map of the island during this, or possibly other voyages	H. C. Chester	<i>Cornelia</i>
1860-62	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Lyon	<i>E. R. Sawyer</i>
1860-62	United States sealing expedition (from New London) Visited Iles de Kerguelen. Lost with all on board in 1862	Capt. Billings	<i>Silver Cloud</i>
c. 1860-70	South African sealing expeditions (from Cape Town) Visited Iles Crozet. During one of these expeditions Capt. Armson collected birds	?	?
1861-65	United States whaling and sealing fleets suffered severe losses during Civil War; either destroyed in action or as "Stone Fleets" sunk in harbour entrances		
1862-64	United States whaling and sealing expedition (from New London) Visited Heard Island	?	<i>Araba</i>
1862-64	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Rogers	<i>E. R. Sawyer</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1862-64	United States sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island. Wrecked at Heard Island. 1 February 1864; crew rescued in October	Alfred Turner	<i>Pacific</i>
1863-65	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Rogers	<i>Charles Colgate</i>
1864	United States sealing expedition (from New London) Visited Iles de Kerguelen, where wrecked on 26 August	Capt. Ward	<i>Somerset</i>
1864-65	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Church	<i>Arab</i>
1864-65	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Turner	<i>Lydia</i>
1864-66	United States sealing expedition (from New London) Visited Heard Island as tender to <i>Roman</i> ; wrecked there on 17 September 1866	Capt. Rogers	<i>E. R. Sawyer</i>
1864-67	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Roswell King</i>
1865-66	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Church	<i>Arab</i>
1865-[67 or 69?]	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Turner	<i>Charles Colgate</i>
1865-68	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Simeon Church	<i>Golden West</i>
1865-68	United States whaling and sealing expedition (from Provincetown) Visited Iles de Kerguelen	Capt. Parsons	<i>M. E. Simmons</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1866-67	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Romana</i>
1867-68	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Church	<i>Romana</i>
1867-69	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Bolles	<i>Charles Colgate</i>
1867-70	United States whaling and sealing expedition (from New London) Visited Heard Island	R. H. Glass	<i>Roswell King</i>
1867-72	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	?	<i>Emma Jane</i>
1868-69	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Romana</i>
1868-71	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Church	<i>Golden West</i>
1869-70	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Williams	<i>Romana</i>
1869-71	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Norie	<i>Charles Colgate</i>
1870-71	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Williams	<i>Romana</i>
1870-71	United States sealing expedi- tion (from New London) Visited South Georgia	? Alfred Turner	<i>Trinity</i> <i>Flying Fish</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1870-73	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Fuller	<i>Roswell King</i>
1871-72	United States sealing expedition (from New London) Visited South Shetland Islands	George Gilderdale James Holmes	<i>Peru Franklin</i>
1871-72	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Williams	<i>Roman</i>
1871-73	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Norie	<i>Charles Colgate</i>
1872-73 ¹	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Church	<i>Flying Fish</i>
1872-73	United States sealing expedition (from New London) Visited Heard Island.	Capt. Turner Capt. Swain	<i>Roman Emma Jane</i>
	<i>Emma Jane</i> , tender to the <i>Roman</i> , did not return until 1877		
1872-76	British expedition Voyage round world; the first steam vessel to cross the Antarctic Circle; reached lat. 66° 40' S. in long. 78° 22' E.; important oceanographical researches and scientific observations at Prince Edward Islands, Iles Crozet, Iles de Kerguelen, and Heard Island, making charts of each group	G. S. Nares	H.M.S. <i>Challenger</i>
1873	Messrs Elder and Nichol of New Zealand started annual sealing expeditions to Macquarie Island, a trade subsequently continued by Joseph Hatch of Invercargill, who also exploited penguins for oil until 1919, when Tasmanian Government refused further licences		
1873-74	United States whaling and sealing expedition (from New London) Visited South Shetland Islands	Capt. Church	<i>Flying Fish</i>
1873-74	United States whaling and sealing expedition (from New London) Visited South Shetland Islands	Capt. Chester	<i>Franklin</i>

¹ In 1871 there was a revival of United States Fur sealing in the South Shetland Islands. Three vessels took 8000 skins in 1871-72; eight vessels took 15,000 skins in 1872-73, and six vessels took 10,000 skins in 1873-74. Details unknown except for those listed. Some of these expeditions probably sailed southwards to Graham Land and the Palmer Archipelago, but detailed records have not been traced. During the next decade the high prices fetched by Antarctic skins resulted in repeated searching of every accessible beach and rock in the Southern Ocean and catastrophic reduction of seal stocks, which in some cases were beginning to recover from earlier devastation.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1873-74	United States whaling and sealing expedition (from New London) Visited South Shetland Islands	Capt. Williams	<i>Golden West</i>
1873-74	German sealing expedition (from Hamburg) Sent out to investigate possibilities of reviving southern sealing; visited South Shetland Islands; first charted Bismarck Strait and roughly charted the mainland coast and islands in this latitude; visited South Orkney Islands	Eduard Dallmann	<i>Grönland</i>
1873-74	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Swain	<i>Roman</i>
1873-74	United States sealing expedition (from Stonington) Visited South Shetland Islands; lost seven men	Andrew J. Eldred	<i>Thomas Hunt</i>
1873-75	United States whaling and sealing expedition (from New London) Visited Heard Island	Capt. Sisson	<i>Charles Colgate</i>
1873-75	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Glass	<i>Francis Allyn</i>
1873-75	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Potts	<i>L. P. Simmons</i>
1873-75	United States whaling and sealing expedition (from New London) Visited Heard Island	Joseph J. Fuller	<i>Roswell King</i>
1874	German expedition Visited Iles de Kerguelen and Heard Island to select base for German Transit of Venus Expedition	Kapt. von Reibnitz	<i>Arkona</i>
1874-75	United States sealing expedition (from Stonington) Visited South Shetland Islands	?	<i>Charles Shearer</i>
1874-75	French Transit of Venus Expedition Observed transit of Venus of December 1874 on Ile St Paul and made meteorological and natural history observations. Charles Vélain made brief visit to Iles de Kerguelen in Norwegian whaler	Admiral Mouchez	<i>Dives</i>
1874-75	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Buddington	<i>Franklin</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1874-75	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Williams	<i>Golden West</i>
1874-75	United States sealing expedition (from New London) Visited Iles de Kerguelen	Joseph J. Fuller ¹	<i>Roswell King</i>
1874-75	United States Transit of Venus Expedition Observed transit of Venus of December 1874 from Pointe Molloy, Baie du Morbihan, Iles de Kerguelen, and made natural history observations; visited Iles Crozet, but unable to land and abandoned project for observing transit there	G. P. Ryan ?	U.S.S. <i>Swatara</i> U.S.S. <i>Monongahela</i>
1874-75	United States sealing expedition (from Stonington) Visited South Shetland Islands, where only one skin secured owing to difficult ice conditions	?	<i>Thomas Hunt</i>
1874-75	British Transit of Venus Expedition Observed transit of Venus of December 1874 at Baie de l'Observatoire, Baie des Swains and Le Pouce on Iles de Kerguelen; A. E. Eaton made natural history observations	S. J. Perry ² H. Fairfax Capt. Inglis	H.M.S. <i>Volage</i> H.M.S. <i>Supply</i>
1874-76	German Transit of Venus Expedition Observed transit of Venus of December 1874 at Anse Betsy, Iles de Kerguelen; carried out surveys and other scientific observations; visited Iles Crozet	Dr Weineck Baron von Schleinitz	<i>Gazelle</i>
1874-76	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Rogers	<i>Roman</i>
1875	British voyage (from England to ?) Wrecked at Iles Crozet on 1 July; 44 men aboard were rescued six months later by United States whalers	?	<i>Strathmore</i>
1875-76	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Neal	<i>Flying Fish</i>
1875-76	United States sealing expedition (from New London) Visited Iles de Kerguelen	Capt. Williams	<i>Golden West</i>

¹ Capt. Fuller was regarded by the transit of Venus expeditions to be the chief authority on Iles de Kerguelen and Heard Island at that time.

² Chief astronomical observer.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1875-76	United States sealing expedition (from Stonington) Visited South Shetland Islands and Gerlache Strait area	Andrew J. Eldred	[<i>Thomas Hunt?</i>]
1875-77	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Sisson	<i>Charles Colgate</i>
1875-77	United States sealing expedition (from New London) Visited South Shetland Islands	Capt. Glass	<i>Francis Allyn</i>
1875-77	United States whaling and sealing expedition (from New London) Visited Iles de Kerguelen and Heard Island	Capt. Fuller	<i>Roswell King</i>
1876	British relief expedition Visited Iles Crozet in search of survivors of <i>Strathmore</i> , wrecked there in 1875, but found they had already been rescued	Lindesay Brine	H.M.S. <i>Wolverine</i>
1876-77	United States sealing expedition (from New London) Visited South Shetland Islands. The mate, Mr King, landed with a crew on Rugged Island, where <i>Florence</i> was unable to pick them up. They wintered under their boat at Potter Cove, ¹ King George Island, but all died except King, who was rescued next season by <i>Francis Allyn</i>	James W. Buddington	<i>Florence</i>
1877	New Zealand whaling and sealing expedition Visited Macquarie Island	Capt. Bezer	<i>Bencleugh</i>
1877-78	United States sealing expedition (from New London) <i>Flying Fish</i> visited South Georgia. H. W. Klutschak accompanied this voyage and published an account of the island, with a sketch map	? ?	<i>Flying Fish</i> <i>Trinity</i>
1877-79	United States sealing expedition (from New London) Visited Heard Island and South Shetland Islands; rescued single survivor of sealing gang from sealer <i>Florence</i> from Potter Cove	R. H. Glass	<i>Francis Allyn</i>
1877-79	United States sealing expedition (from New London) Visited Iles de Kerguelen	?	<i>Roswell King</i>
1877-?	United States sealing expedition (from Stonington) After leaving a sealing gang at Islas de Diego Ramirez, sailed for South Shetland Islands and disappeared without trace	James Appleton [or Appleman?]	<i>Charles Shearer</i>

¹ It is not clear how they got from Rugged Island to Potter Cove; presumably in their own boat.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1878	United States sealing expedition (from New London) Probably landed on Bouvetøya	John Williams	<i>Golden West</i>
1878-79	United States sealing expedition (from New London) Visited Iles de Kerguelen	E. S. MacDonald	<i>Edward Johnson</i>
1878-79	United States sealing expedition (from Stonington) Visited South Shetland Islands	Andrew J. Eldred	<i>Thomas Hunt</i>
1878-79	United States sealing expedition (from New London) Visited South Georgia	Benjamin N. Noyes	<i>Trinity</i>
1879-80	United States sealing expedition (from Stonington) Visited South Shetland Islands, South Orkney Islands and Trinity Peninsula; unsuccessful search for missing sealing schooner <i>Charles Shearer</i>	Thomas B. Lynch	<i>Express</i>
1879-80	United States sealing expedition (from New London) Visited Iles de Kerguelen	?	<i>Mary E. Higgins</i>
1879-80	United States sealing expedition (from Stonington) Visited South Shetland Islands; also took part in unsuccessful search for <i>Charles Shearer</i>	Andrew J. Eldred	<i>Thomas Hunt</i>
1880	British expedition Visited Iles Crozet and left provision depots on three main islands	J. N. East	<i>H.M.S. Comus</i>
1880-81	New Zealand sealing expedition Professor J. H. Scott visited Macquarie Island with this sealing schooner and made natural history observations	Capt. Cowper	<i>Jessie Nichols</i>
1880-[82?]	United States sealing expedition (from New London) Visited Iles de Kerguelen; not heard of after May 1882	?	<i>Pilot's Bride</i>
1880-82	United States sealing expedition (from New London) Visited Iles de Kerguelen, where wrecked in 1881; crew rescued by <i>Marion</i> in 1882	?	<i>Trinity</i>
1881	Falkland Islands Government Ordinance No. 4 of 1881 first made regulations for control of sealing industry in Falkland Islands and their Dependencies		
1881-82	United States rescue expedition Searched for and found missing sealing bark <i>Trinity</i> , and found crew at Iles de Kerguelen	?	<i>U.S.S. Marion</i>

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1882	United States sealing expedition (from New London) Sighted Bouvetøya	Rastus Church	<i>Delia Church</i>
1882-83	German International Polar Year Expedition Wintered at Royal Bay, South Georgia, making scientific observations	K. Schrader Kapt. Pirner Kapt. Krokisius	<i>Moltke</i> ¹ <i>Marie</i> ²
1885-86	United States sealing expedition (from Stonington) Visited South Georgia; G. Comer, one of the sealers, collected birds	?	<i>Express</i>
1887	French voyage (from Bordeaux) Wrecked on Iles Crozet on 9 March; whole crew perished	P. Majou	<i>Tamaris</i>
1887	French expedition Visited Iles Crozet to search for castaways from <i>Tamaris</i> and to re-stock provision depots	?	<i>Meurthe</i>
1887-89	United States sealing expedition (from New London) Visited Iles Crozet, Iles de Kerguelen and South Georgia; G. Comer, one of the sealers, collected birds	Joseph J. Fuller	<i>Francis Allyn</i>
1888-89	United States sealing expedition (from New London) Visited South Shetland Islands but took only thirty-nine seal skins	James W. Buddington ³	<i>Sarah W. Hunt</i>
1891	Tasmanian Government passed regulations on 21 April prohibiting killing of seals at Macquarie Island without permit. Joseph Hatch of Invercargill, New Zealand, was granted a lease (continued until 1918) to collect seal and penguin oil at Macquarie Island		
1891	New Zealand expedition Visit of New Zealand Government steamer to Macquarie Island; Capt. Fairchild made a sketch chart	Capt. Fairchild	<i>Hinemoa</i>
1892-93	British whaling expedition (from Dundee)	Alexander Fairweather } Thomas Robertson } Robert Davidson } James Davidson }	<i>Balæna</i> <i>Active</i> <i>Diana</i> <i>Polar Star</i>
	Pioneer British whaling reconnaissance; W. S. Bruce (<i>Balæna</i>) and C. W. Donald (<i>Active</i>) undertook some scientific work in the Joinville Island group and northern Trinity Peninsula; Capt. Robertson discovered and roughly charted Active Sound and Firth of Tay		

¹ For outward voyage, 1882.² For return voyage, 1883.³ Capt. Buddington probably returned the following season, but the seals in the area were by then worked out.⁴ Sailed in company.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1892-93	French expedition	Cdt. Lieutard	<i>Eure</i>
	Hoisted French flag in Iles de Kerguelen at Port Christmas and Bassin de la Gazelle on 2 and 4 January 1893, respectively, to re-assert sovereignty; made hydrographic surveys		
1892-93	Norwegian whaling expedition	Carl Anton Larsen	<i>Jason</i>
	Pioneer Norwegian whaling reconnaissance; collected fossils on Seymour Island; discovered Foyen Coast and penetrated Weddell Sea to lat. 64° 40' S., long. 56° 30' W., reporting an "appearance of land" to the west of this position; visited South Orkney Islands		
1893	French Government granted exclusive 50-year lease to exploit Iles de Kerguelen to MM. René and Henri Bossière, who did not succeed in establishing a whaling and sealing station there until 1909		
1893-94	Norwegian sealing expedition	Morten Pedersen } C. J. Evensen }	<i>Castor</i> <i>Hertha</i>
	Visited South Shetland Islands; <i>Hertha</i> sailed south between the Biscoe Islands and Graham Land to lat. 69° 10' S., and sighted Adelaide Island and Alexander Land		
1893-94	United States sealing expedition (from New London)	Joseph J. Fuller	<i>Francis Allyn</i>
	Reported two islands in the position at which Bouvetøya had previously been reported (since disproved); visited Iles de Kerguelen		
1893-94	Norwegian whaling expedition	C. A. Larsen	<i>Jason</i>
	Discovered King Oscar II and Foyen Coasts and Robertson Island; penetrated Weddell Sea coast of Graham Land to lat. 68° 10' S.		
1894	New Zealand sealing expedition (from Invercargill)	?	<i>Gratitude</i>
	A. Hamilton and Mr Jennings (taxidermist) made biological observations and collections at Macquarie Island for Otago University Museum; transported by Joseph Hatch who was then engaged in Elephant sealing at the island		
1894-95	Norwegian expedition	Henrik J. Bull Leonard Kristensen	<i>Antarctic</i>
	Sent out by Svend Foyn to investigate whaling possibilities in Antarctic. Visited Prince Edward Islands and Iles Crozet without landing; took Elephant Seals at Iles de Kerguelen and Macquarie Island; sighted Balleny Islands; landed on Possession Island off Victoria Land, and at Cape Adare (the first landing in Victoria Land) on 24 January 1895		
1895	New Zealand sealing expedition (from Invercargill)	?	<i>Gratitude</i>
	Visited Macquarie Island; J. Burton, one of the sealers, collected birds		
1897-98	Australian sealing expedition	Hans Gundersen	<i>Edward</i>
	Visited Iles de Kerguelen; Robert Hall made ornithological and botanical observations and collections		

¹ Sailed in company.

<i>Date</i>	<i>Nationality, etc.</i>	<i>Leader or Commander</i>	<i>Ship</i>
1897-99	Belgian Antarctic Expedition	Adrien de Gerlache de Gomery	<i>Belgica</i>
Visited South Shetland Islands; explored Bismarck Strait; discovered and mapped Gerlache Strait and Danco Coast; named Palmer Archipelago; sighted Alexander Land. The <i>Belgica</i> was beset in the pack ice and drifted south off Peter I Øy for 12 months, the first exploring vessel to winter in the Antarctic			
1898-99	German Deep Sea Expedition	Carl Chun Kapt. Krech	<i>Valdivia</i>
Oceanographical cruise; visited Iles de Kerguelen and Bouvetøya, accurately fixing the position of the latter for the first time			

(*To be continued*)

NUTRITION AND ENERGY EXPENDITURE DURING A POLAR EXPEDITION

[By J. P. MASTERTON,* H. E. LEWIS* and E. M. WIDDOWSON;† published in *Advancement of Science*, Vol. 13, No. 53, 1956, p. 414-16.]

Food intake on a polar expedition has always been a problem to those in charge of the commissariat. For years it has been accepted that man has a very high energy expenditure while sledging. Because of this it has always been the custom to provide a sledging diet which yields the greatest number of calories in the smallest weight.

In the days of Scott and Shackleton this was not easy because of the limited pay-load on dog sledges, which had to carry tents, scientific equipment, clothing, fuel and dog food, as well as man food. However, in recent years a ration has been evolved which for a minimum of weight provides an intake of approximately 4200 calories in the ratio of Protein:Fat:Carbohydrates of 1:2·8:3·1. This ration weighs 760 g. without packing.

On the British North Greenland Expedition¹ which spent two years within 800 miles of the North Pole, there was an opportunity to investigate both the energy intake and expenditure of men doing hard sledging. Many dog-sledge journeys were made over rough glacier country at temperatures around -20°C . and it was on such journeys that part of the investigation was carried out. As a control, energy-balance studies were made at the base hut where we lived throughout the Arctic winter.

Three problems were studied:

- (1) The energy balance of men living at the base hut.
- (2) The energy balance of men while sledging.
- (3) The fat utilization of the body while living on the high fat diet of sledging.

This latter investigation was the one which prompted the whole experiment. We had noted early in the expedition that our husky dogs ate human faeces voraciously. We wondered, since we were living on a high fat diet, whether the dogs were deriving any benefit from the faeces in the form of unabsorbed fat.

Four men were chosen for the investigation and three energy-balance surveys were carried out—two at the base hut and one while sledging.

There was no means of measuring the oxygen consumption, and therefore the energy expenditure of the men during various activities. The only exact measure we had in this respect was a measure of the basal metabolic rate of each man throughout the three surveys. However, a time-and-motion study of each man's daily activity was made. These time figures were then converted into energy expenditure by comparing them with the mean of many figures for equivalent activities found in the literature.² From this a figure for each man's daily energy expenditure was found.

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The food intake on all the surveys was accurately weighed and the weights of foods were then converted into their constituent items and expressed as protein, fat, carbohydrate and calories using the tables of McCance and Widdowson.³

At the base hut the daily individual intake for each of the four men was measured for two periods of a week with a four-week interval between each survey.

Normally the sledging ration carried was a standard one which occasionally left one hungry after it had been eaten. Therefore on the sledging survey liberal supplies of extras were taken so that each subject could eat as much as he liked. As a result there was day-to-day and inter-subject variation between the sledging dietary intake. The sledging survey was made on the same four men, who sledged in two parties of two. While they were sledging the temperatures were around -20°C . and the men were doing hard sledging or rock scrambling for 6-8 hours per day with occasional rest days. The experiment lasted nineteen days in the case of one party and ten days in the case of the other. In each the men had been out for a week or more before the investigation began.

From two of the men the total stools were collected during fourteen days while the energy-balance survey was in progress. These stools froze very soon after they were passed and were then scooped into polythene bags in which they were stored. When the thaw came they were stored with chipped ice in large thermos flasks. Finally, they were brought back to Britain in the frozen state where they were analysed for their fat content.

The four subjects were normal healthy adults. Table 1 shows their ages, heights and average weights during the surveys.

Table 1. *Ages, heights and average weights of subjects*

Name	Age (years)	Heights (cm.)	Av. weight (kg.)
R.B.	26	176	77
J.M.	25	166	70
A.E.	25	182	83
P.W.	23	180	87

It was found that while living at the base hut there was considerable variation in the food intakes and also in the estimate of the energy expenditure. The intake ranged from 1630 to 8760 calories per day, with a mean of 3880 calories.

While sledging the intake was much more constant. This may have been due to the fact that the energy expenditure was more uniform in that each day's activity consisted of 6-8 hours sledging and 16-18 hours in the tents. On the other hand, at base, activities varied from sitting writing all day to ski-ing and other hard exercise for a number of hours.

While sledging the intakes ranged from 4000 calories to 5740 calories per day, with a mean of 4770 calories per day. Table 2 shows the mean daily energy balance of the four subjects on all three surveys.

It was found that the fat intake while sledging was high and for the two

subjects from which the total stools were collected for fourteen days the mean fat intake was 285 and 273 g., respectively.

Table 3 shows the composition of the faeces of the two men and the intake and absorptions of fat on this high-fat diet. In spite of an intake of the order of 280 g. of fat per day these men had an absorption of 96.8 and 96.3 %. Therefore the dogs were certainly not deriving any significant quantity of nutrition from the faeces and unless future investigations can show the presence of some other substance in the faeces useful to dogs, we must assume that they ate human faeces because they liked it.

Table 2. *Mean daily intake and expenditure on surveys*

	R.B.		J.M.		A.E.		P.W.	
	Intake	Expendi- ture	Intake	Expendi- ture	Intake	Expendi- ture	Intake	Expendi- ture
Base I	3800	3706	3600	3442	3600	3778	5090	3618
Base II	3780	3810	3570	3666	3910	3563	4440	3566
Sledging	4850	5119	4520	5013	4870	5311	4840	5349

Table 3. *Composition of faeces of two men*

(Mean of 14 days)

Weight of fresh faeces, g./day	164.0	162.0
Weight of dry faeces, g./day	39.3	40.4
Fat, g./100 g. dry faeces	22.3	23.7
Intake of fat, g./day	285.0	273.0
Excretion in faeces, g./day	9.0	10.0
Absorption, g./day	276.0	263.0
Absorption as % intake	96.8	96.3

Finally, the figure of 4770 calories for the mean calorie intake while sledging would suggest that previous sledging ration offering 4200 calories is rather low, and future expeditions should aim at offering a ration which gives 4800 calories per day. With modern packaging techniques this new ration should weigh no more than the old ration packed in tins as it has been until the present.

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FIELD WORK

BROOKS RANGE PROJECT, ALASKA, 1955 AND 1956

[Summarized from a note by G. Fitz-Gerald in *The Canadian Surveyor*, Vol. 13, No. 8, 1957, p. 484-90.]

The object of the Brooks Range Project is to complete the topographical mapping of Alaska in the scale of 1:250,000, with a contour interval of 200 ft. The area covered by the project is over 120,000 sq. miles, and lies north of lat. 66° N. It stretches in a belt, about 250 miles wide and 500 miles long, westwards from the Alaska-Canada border and includes the whole of Brooks Range.

Air photography in the summers of 1955 and 1956 was carried out by Mark Hund Aerial Surveys under contract with the Topographical Division of the United States Geological Survey. Transverse twin low-oblique photographs were taken on east to west flights of 30,000 ft. and 14 miles apart. Contact flights to assist in bridging were made to obtain convergent low-oblique photographs over the roughest parts of the Brooks Range. These flights were made in north to south lines about 40 miles apart. During the first season 85 per cent of the contract area was photographed in eight flying days. In 1956 the contract was increased by about 1600 linear miles of photography. In nine photographic days the original contract was completed, and 77 per cent of the new contract.

Vertical ground control was established by means of the phototrig traverse method. This consists of simultaneous observation of reciprocal vertical angles between successive stations, each of which can be located on an air photograph. The horizontal distance required to compute the difference of elevations is obtained from the mosaic. During the summer of 1956 three field parties worked in the area from 24 May to 23 July. Each party was supported by two helicopters and a fixed-wing aircraft and consisted of a leader, three surveyors, three pilots, a field assistant, mechanic and cook. In addition to phototrig traverse lines they ran altimeter lines by the leap-frog method; this was partly to test the method and partly to insure against a bust between stations. The three parties ran 1654 miles of phototrig traverse and 2026 miles of leap-frog altimetry, and also established 352 phototrig traverse stations and 433 altimeter elevations.

DANISH SCIENTIFIC WORK IN GREENLAND, 1956

[Summarized from information supplied by Arktisk Institut, Copenhagen.]

West Greenland

Geology. Parties from Grønlands Geologiske Undersøgelse [Geological Survey of Greenland] worked in several areas of west Greenland during the summer of 1956. Thirty-five geologists and assistants worked on the geological survey of the Umanak district. Other areas in which geological survey was carried out were: the inner part of Gothåbsfjord by H. Sørensen; in Tovqussaq, between Godthåb and Sukkertoppen, by A. Berthelsen, who also led a party working in the area between Kuanit and Qôrnoq; and the Ilimausak area of Julianehåb district by J. Bondam.

Magnetic investigations were made on Nûgssuaq and Disko by O. Münther and J. Rasmussen.

Geiger counter tests were made in Umanak Fjord by K. Jakobsen and on Nûgssuaq by J. Bugge, K. Jakobsen, E. Koch, O. Münther, J. Rasmussen, A. Rosenkrantz and K. Skou.

Glaciology. A. Weidick worked around Godhavn and on the north coast of Nûgssuaq.

Botany. Work was carried out by K. Holmen and Jakobsen in a number of centres between Egedesminde and Upernavik.

Palaeontology. Fossils were collected on Nûgssuaq and Svartenhuk by Bugge, Koch, Rosenkrantz and Skov.

Archaeology. J. Meldgaard, of the National Museum, spent June and July visiting Palæo-Eskimo and Neo-Eskimo sites in Holsteinborg district. He also discovered a Sarqaaq site near Egedesminde.

East Greenland

Geology. A party of seven geologists and eight assistants, led by Lauge Koch, worked in the north-east of Greenland. The main objectives were the revision of the geological maps of the area between Kuhn Ø and Moskusokse Fjord, and the survey, with the aid of a helicopter, of nunataks in Bartholins Land. Heres, A. Perenoud and J. Putallaz worked on Traill Ø and Kempter on Schucherts Flod. H. Bütler worked at Loch Fyne, Krumme Langsø, and Hurry Inlet.

The geological survey of the region between Danmarks Fjord and Mesters Vig is now completed.

Palaeontology. E. Jarvik collected vertebrate fossils in the Middle Devonian sediments in Canning Land.

Zoology. C. Vibe visited the Scoresby Sund area to inspect the Musk-ox population, making trips by foot and by air. The number in Jameson Land was estimated at 1250 and very few calves were seen. Further inland the number of calves was normal.

EXPEDITIONS OF NORSK POLARINSTITUTT TO SVALBARD AND EAST GREENLAND, 1956 AND 1957

[Summarized from notes provided by Norsk Polarinstitut. Previous reports were given in the *Polar Record*, Vol. 7, No. 47, 1954, p. 44-66 (seasons of 1951 and 1952); No. 50, 1955, p. 394-95 (seasons of 1953 and 1954) and Vol. 8, No. 53, 1956, p. 154 (season of 1955).]

Svalbard, 1956

The expedition, led by K. Z. Lundquist, left Åndalsnes on 16 June 1956 on *Minna* and reached Vestspitsbergen on the 23rd. It consisted of 50 men. The programme of work carried out during the season was as follows: T. Askheim, topographical survey at Hopen; S. Helle, topographical survey in Raudfjorden-Breibogen area; O. Liestøl, glaciology on Finsterwalderbreen in Van Keulenfjorden; H. L. Løvenskiold, ornithology in Kongsfjorden, Kong Karls Forland and Krossfjorden; H. Major, geology in Adventdalen and Braganzavågen; W. Solheim, topographical survey in the outer Bellsund-Isfjord area; and Y. Winsnes, geological survey in Bellsund area. K. Z. Lundquist made hydrographic surveys and inspected lights and beacons from *Nordsyssel*; B. Luncke took a number of air photographs, in continuation of previous work, from a "Catalina" lent to the Norsk Polarinstitut by the Norwegian Royal Air Force. The aircraft worked from a base at Kapp Wijk, in Dicksonfjorden, which had been established by *Minna*. H. Hornbæk carried out a hydrographic survey from *Svalis* in the Bellsund area.

Minna left Longyearbyen on 7 September and, having lost her propeller near Hornsund, was towed to Åndalsnes, arriving there on the 18th.

Svalbard, 1957

The expedition consisted of thirty men and was again led by K. Z. Lundquist. Part of it sailed on 18 June 1957 on *Minna* from Åndalsnes, and the remainder in *Sjøovern* on the 22nd from Harstad; both ships reached Isfjorden on 25 June. The

programme of work carried out during the season was as follows: T. Askheim, topographical survey in Nordfjorden area; A. Bergersen, hydrographic survey of north coast; A. Hjelle, geology on Nordaustlandet; H. Hornbæk, hydrographic survey in Raudfjorden; H. Major, geology in Woodfjorden-Liefdefjorden and between Adventdalen and Braganzavågen; and T. Winsnes, geology in Nordaustlandet. K. Z. Lundquist inspected lights and beacons, then carried out a magnetic survey with K. Borg of the Swedish-Finnish-Swiss Expedition, and finally did some hydrographic work and revision of glacier fronts. He sailed round Nordaustlandet and Kvitøya between 24 and 27 August. According to sealers the ice edge was 60 nautical miles north of Kvitøya during part of this summer. Many glacier fronts showed considerable retreat during the past 20 years, especially at Hornsund.

The expedition left Longyearbyen in the two ships on 31 August.

Relief expeditions to north-east Greenland, 1956 and 1957

The annual expeditions to Jan Mayen, Myggbukta and the north-east Greenland hunting stations were made in *Polarbjørn*, under the leadership of John Gæver. During the return voyage in August 1957 *Polarbjørn* was beset and had to be abandoned.¹

BRITISH UNIVERSITY ARCTIC EXPEDITIONS,
1956 AND 1957

London University North Sweden Research Group, 1956 and 1957

[Summarized from unpublished reports by R. P. Kirby and M. C. Naish.]

The main object of this group was to establish sufficient ground control points to enable a map to be plotted from air photographs of an area in north Sweden. The area selected covers about 175 sq.km. and is situated between the districts of Katterjaure and Sjängeli in lat. 68° 20' N., long. 18° 20' E. It was last surveyed in 1886 but the resulting map was inaccurate. It is a mountainous area ranging in height from 690 to 1500 m., with considerable complexity of contours and an irregular drainage system of lakes and marshes.

Members of the 1956 party were:

R. P. Kirby, Leader, geographer
L. A. J. Baden, Geomorphologist
B. R. Brown, Geologist
S. B. Chapman, Botanist
B. N. Davies, Physiologist

P. R. Hart, Surveyor
B. V. H. Milborrow, Botanist
D. B. Owen, Geographer
R. Parvin, Surveyor
P. T. Walsh, Geologist

In 1957 another party visited the area to complete the work begun in 1956. Members were:

M. C. Naish, Leader, geographer
B. R. Brown, Geologist
T. E. Bulley, Surveyor
D. Burnett, Botanist
D. C. Foulger, Geologist

B. Gardiner, Zoologist
I. F. C. Hampton, Physiologist
J. P. Holding, Geographer
A. M. Peatfield, Surveyor
C. Webster, Botanist

University of Durham Exploration Society Expedition to Lyngen, Norway, 1957

[Summarized from information provided by N. Aitkenhead.]

This party spent about eight weeks in the Lyngen peninsula during the summer of 1957. Members were: N. Aitkenhead, leader and glaciologist; D. A. Ards, geologist.

¹ *Polar Record*, Vol. 9, No. 58, 1958, p. 51-52.

D. Aubin, geographer; B. L. Burrough, surveyor; J. M. Cheesmond, geographer; H. G. Hale, zoologist; and J. Tarney, geologist.

From a camp near Lyngseidet the party worked on the geography, geology, glaciology and zoology of the surrounding area. The main party left Lyngen on 10 September.

Cambridge University Expedition to Spitsbergen, 1957

[Summarized from a note by P. F. Friend. Accounts of work by previous Cambridge expeditions in this area were published in the *Polar Record*, Vol. 7, No. 48, 1954, p. 151 and Vol. 8, No. 55, 1957, p. 349.]

The object of this expedition was to continue and extend the geological and topographical survey of north Dickson Land, which was begun in 1953 by the Cambridge University Geological Expedition. Members were: P. F. Friend, leader; M. J. Alderidge, M. J. Bowden and P. T. Warren.

The party was landed in Billefjorden on 9 July and sledged to Austfjorden. Work was carried out on the west of Austfjorden and in Vestfjorden, and the party left Billefjorden again on 28 August.

Nottingham University Exploration Society Expedition to Spitsbergen, 1957

[Summarized from information provided by G. W. G. Sharp.]

The object of this expedition was to carry out physiological, geological, botanical and ornithological studies in an area north of Kongsfjorden, in Vestspitsbergen. Members were: G. W. G. Sharp, leader and physiologist; J. H. Bell, haematologist; B. T. Bingham, ornithologist; D. W. Coupe, pharmacist; M. J. Entwistle, biochemist; G. Hill, botanist; W. T. C. Holden, pharmacist; L. J. Monkman, geologist; W. I. Naylor, geologist.

The party worked from a camp on the slopes of Feiringfjellet during July and August.

Queen's University Expedition to Spitsbergen, 1957

[Summarized from information provided by P. Robson.]

During July 1957 a party from the Queen's University of Belfast carried out geological and topographical work in Vestspitsbergen. The party was divided into two groups. The first was led by P. Robson and included B. Kennedy, surveyor; K. Millar, doctor and assistant surveyor; and J. Preston, geologist; the second consisted of W. Schwarzacher, leader, and D. Bates, both geologists.

The party landed at the head of Ekmanfjorden at the end of June. The first group sledged to the south end of Snøfjella, above Woodfjorden, and carried out geological and survey work from there and later from a camp further east towards Dovrefjell. The second group worked from camps on the east side of Ekmanfjorden and the west side of Dicksonfjorden.

The party travelled along the coast to Longyearbyen in a 16 ft. boat with an outboard motor, and left Spitsbergen on 6 August.

Reading University Zoological Expedition to West Greenland, 1957

Summarized from a note by M. M. R. Freeman.]

A party of four men from Reading University spent from 9 July to 30 August 1957 in west Greenland. Members were: M. M. R. Freeman (leader), N. G. Blurton Jones and R. Passey, all zoologists; and R. A. F. Gillmor, ornithologist and photographer.

A camp was established at Sassendalen and visits made by means of 18 ft. "commando" canoes, powered by sideboard motors, to a number of places in Sassenfjorden

and Tempelfjorden, and once to Adventfjorden. At the end of July the party moved to Skottehytta in Ebbadalen, using a catamaran made from the two canoes to visit points on the coast of Bünsow Land.

Geological Work in North Vestspitsbergen, 1957

[Summarized from a note by C. B. Wilson. Accounts of work by previous Cambridge expeditions in the area were published in the *Polar Record*, Vol. 7, No. 48, 1954, p. 151 and Vol. 8, No. 55, 1957, p. 349.]

Between 28 June and 27 September 1957, C. B. Wilson of Cambridge University continued the geological and topographical survey in north Vestspitsbergen which was begun in 1953 by the Cambridge University Geological Expedition. He travelled in a 4 m. aluminium boat with two outboard motors up the coast from Longyearbyen to Ny-Ålesund, and was then taken in *Minna* to Raudfjorden. Thence he went on to Wijdefjorden and crossed the Ny Friesland ice cap to Veteranen and Lomfjorden.

He completed a geological and topographical survey of lower Veteranen and Glintbreen in Ny Friesland, and collected orientated specimens from Andrée Land and near Kap Linné for palaeomagnetic work.

FINNISH OCEANOGRAPHICAL WORK IN THE BARENTS SEA, 1957

[Summarized from a note by Professor I. Hela.]

Between 1 and 27 July 1957 a party from Merentutkimuslaitos [Institute of Marine Research] carried out oceanographical work in the Barents Sea and north of Spitsbergen, between lats. 70° 26' N. and 80° 24' N. and longs. 12° 10' E. and 41° 50' E.

Members of the party, which travelled in the *Aranda*, were:

Professor I. Hela, Leader and hydrographer	N.-E. Laurell, Geologist
G. Åberg, Chemist	S. Nordström, Hydrographer
Professor G. Granqvist, Hydrographer	E. Palosuo, Hydrographer
A. Häggblom, Geologist	M. Sippola, Geochemist
T. Honkasalo, Gravimetric measurements	V. Sjöblom, Biologist
H. Ignatius, Geologist	A. Voipio, Chemist
F. Koroleff, Chemist	K.-E. Wärme, Chemist

During the season 55 hydrographic and 270 bathythermograph stations were worked, and a large number of salinity and other chemical determinations made.

On reaching Spitsbergen Wärme joined the Swedish-Finnish-Swiss Expedition to Nordaustlandet;¹ Häggblom and Palosuo also left *Aranda* to work on their own in the same area.

SWEDISH GLACIOLOGICAL EXPEDITION TO NORDAUSTLANDET, 1957

[By Weston Blake, jr.]

A party of four worked in the Murchisonfjorden area of Nordaustlandet, Spitsbergen from 21 July to 27 August 1957; they were Weston Blake jr., field leader and glaciologist; C. Ehrström, general assistant; A. Häggblom, geographer; and E. Palosuo, hydrographer and ice crystallographer. The expedition was organized by Valter Schytt, who had visited Vestfonna in 1956 by helicopter from the Soviet icebreaker *Ob'*. On this occasion he had established ablation-accumulation stakes and thermistors on the summit of Vestfonna, close to the Central Station of the Oxford University Arctic Expedition, 1935-36.

¹ *Polar Record*, Vol. 9, No. 58, 1958, p. 24.

The party travelled to Nordaustlandet with the Swedish-Finnish-Swiss International Geophysical Year expedition, and went on to set up camp at Snaddvika, at the head of Murchisonfjorden, near Vestfonna. Häggblom and Ehrström obtained cores of sediments in a series of lakes between Snaddvika and Vestfonna, while Blake and Palosuo established a profile of ablation-accumulation stakes, 6 km. long, extending up to the firm area of Vestfonna. Thermistors were installed to a depth of 5 m. in ablation and superimposed ice zones.

The party returned to Kinnvika on 16 August and Ehrström, Häggblom and Palosuo left on the 27th on *Sjøvern*. Schytt and Professor S. Hoppe, glacial morphologist, arrived in the Swedish Air Force "Catalina" on 16 August. During the next ten days a large number of vertical air photographs were taken, from 500 and 3000 m., of Vestfonna and the area around Murchisonfjorden and Lady Franklinfjorden.

During September Blake, and members of the Swedish-Finnish-Swiss Expedition, initiated a theodolite survey of the movement of southern Franklinbreane in Lady Franklinfjorden, and continued glaciological work on Vestfonna.

It is intended to continue and extend this work in 1958.

TROMSÖ MUSEUM EXPEDITION TO BJØRNØYA, 1957

[From a note by O. I. Rønning.]

During the summer of 1957 a party from Tromsø Museum carried out botanical and zoological work on Bjørnøya. The party consisted of: Å. Andersson, B. Christiansen and P. Kognestad, zoologists; and O. I. Rønning and O. Skifte, botanists.

Camps were set up in the south-west of the island near Ellasjøen, in the south-east near Kvalrossbukta, and in the north near the island's radio and meteorological station.

The party, travelling in the museum research vessel *Asterias*, left Bjørnøya on 6 September.

GEOLOGICAL RESEARCH ON UBEKENDT EJLAND, WEST GREENLAND, 1957

[Summarized from a note by H. I. Drever. Previous accounts of his geological work in this area were published in the *Polar Record*, Vol. 2, No. 15, 1938, p. 37; Vol. 3, No. 17, 1939, p. 32, No. 18, 1939, p. 110-11; and Vol. 6, No. 42, 1951, p. 263-64.]

Between 6 July and 15 September 1957 H. I. Drever continued his geological survey of the development of the Tertiary picritic minor intrusions and vesicular lavas in the coastal cliffs of Ubekendt Ejland, west Greenland. The work was carried out from a camp at Igdlorssuit and much of the travelling was done in a 14 ft. dinghy with an outboard motor.

ARCTIC CRUISE OF U.S.S. NAUTILUS, 1957

[Summarized from *The Times* of 28 October 1957 and the *New York Times* of 30 October 1957.]

In the course of a cruise during the summer of 1957 U.S.S. *Nautilus*, captain Commander W. R. Anderson, spent 5½ days under the ice in the Arctic basin, on one occasion remaining submerged for 74 hours. This atomic submarine reached lat. 87° N., about 180 miles from the North Pole. Waldo B. Lyon, and a party of scientists from the United States Navy Electronics Laboratory, San Diego, were on board and carried out investigations during the cruise.

Nautilus was accompanied by *Trigger*, a conventional snorkel-type submarine, which also made an under-ice cruise, but for a shorter period.

CANADIAN OPERATION "MACKENZIE", 1957¹

[By R. J. W. Douglas].²

During the summer of 1957 the Geological Survey of Canada carried out a helicopter-assisted geological reconnaissance of 100,000 square miles of Mackenzie District. The reconnaissance, which was known as Operation "Mackenzie", was the seventh such operation by the Geological Survey using helicopters to survey large relatively inaccessible regions of Canada.

The region surveyed covers the drainage basin of the upper Mackenzie River. It extends from 60° N., the northern boundary of the provinces of Alberta and British Columbia, to lat. 64° N., a distance of some 275 miles, and from the boundary of the Interior Plains with the Precambrian Shield to long. 126° W.

The principal objectives of the Operation were: to acquire stratigraphic information on the sequence of bedrock formations throughout the area; to effect their correlation and study their variations and mode of origin; to prepare geological maps of the plains in the area on a scale of 1 in. to 8 miles, and of the mountains on a scale of 1 in. to 4 miles; to assess the economic possibilities of the area as a source of oil, gas, coal and minerals; and to collect data on the superficial and glacial deposits and such other information as may have a bearing on the economic development of the area.

The field party consisted of 29 men, of whom 9 were officers of the Geological Survey of Canada: R. J. W. Douglas (geologist-in-charge), W. B. Brady, B. G. Craig, P. Harker, D. J. McLaren, A. W. Norris, D. K. Norris, B. R. Pelletier and D. F. Stott. The remainder of the party comprised 9 survey assistants, 3 aircraft pilots, 3 aircraft engineers, a boatman and crewman, a radio operator and 2 cooks.

The party made use of two Bell 47 D 1 helicopters, equipped with floats for operating on the plains and with skids for the mountainous terrain, and a De Havilland "Beaver", equipped with ski-wheels at the beginning of the field season and with floats following the breakup. An 85 h.p. river boat and barge of 10 tons capacity were also chartered. These craft were used for moving equipment, fuel and supplies on the Mackenzie and Liard Rivers, and the boat for geological traverses. The helicopters carried "Sarah" as emergency equipment.

The "Beaver" aircraft was employed in establishing fuel and oil caches for the helicopters to extend their range; moving geologists and supplies; general geological reconnaissances; moving camps; and bringing in supplies and mail.

The helicopters were used for geological observations and to move men and supplies. On the plains their main use was for the collection of stratigraphic information, and in the mountains it was for mapping and observing structural data. They were used to carry geologists on day visits from base camps to working points.

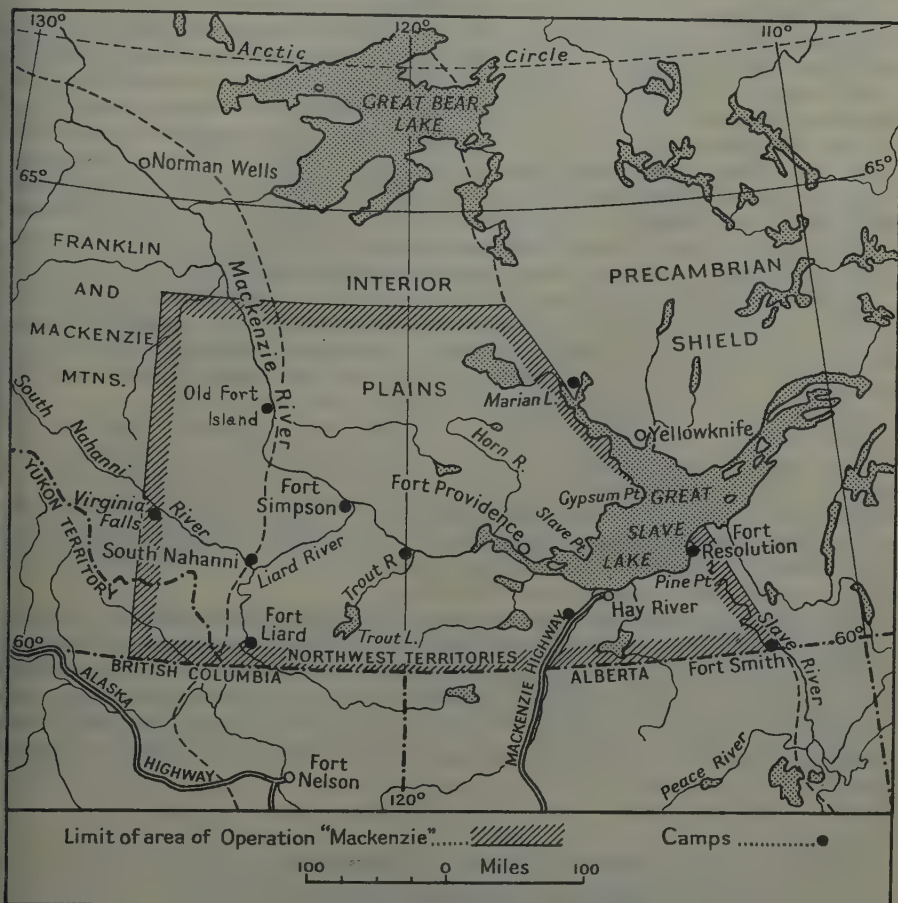
The base camp was set up some 30 miles south of Hay River on the Mackenzie Highway, and most of the party, and the helicopters, arrived in early May. Working over the breakup period in May was found satisfactory, though water levels were high and a few exposures were under water and inaccessible. Breakup occurred in three stages—on the main rivers at the beginning of May, on the small lakes of the Interior Plains from the middle to end of May, and on Great Slave Lake in the middle of June.

From Hay River base camp geological work centred mainly on the area accessible by car along Mackenzie Highway and the road leading west to Fort Providence. The

¹ Published by permission of the Director, Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa.

² Head of Fuels Section, Fuels and Stratigraphic Geology Division, Department of Mines and Technical Surveys.

adjacent interior was reached by helicopter and, to a minor extent, by daily setouts and from temporary camps. One helicopter and two parties of a geologist and assistant were stationed at Fort Smith and Fort Resolution. The "Beaver" was used to move their camps to airstrips at these places and at Pine Point. The north-west shore of Great Slave Lake was examined from Slave Point to Gypsum Point by a combination of helicopter traverses and ground work.



Canadian Operation "Mackenzie", 1957

As work progressed westward beyond the limits of operation from Hay River base, a camp was established by the "Beaver" at the mouth of Trout River. From there, three geologists with one helicopter continued work, ultimately moving to Fort Simpson and thence to South Nahanni by early July. The geology was done mainly by air traverses, daily setouts and from camps on the tributaries to the Mackenzie River where exposures were best. The upper part of Trout River, the largest of the tributaries, was covered by canoe, flown in by helicopter.

In mid-June the remainder of the party was moved by the "Beaver" to Marian Lake. From Marian Lake camp the "Beaver" was used a great deal, as the party

consisted of five geologists with only one helicopter. The helicopter was used mainly for traverses along the shore of Great Slave Lake, and to reach into the interior to places inaccessible to the "Beaver".

Work was completed at Marian Lake by the end of June, and camp moved to South Nahanni by the "Beaver" assisted by an "Otter" from Yellowknife. Supplies left at Hay River town were moved to South Nahanni by the boat and barge, together with the camp at Fort Simpson where work had also been completed.

From South Nahanni camp the country to be reached fell mainly into three parts—the mountains and plateau to the south-west, the mountains and plateau to the north-west, and the plains to the east. Two parties had left Hay River by boat for South Nahanni in early June, shortly after the rivers were free of ice, to examine sections of Carboniferous strata accessible from the rivers. This enabled a start to be made on the mountains while the remainder of the party completed work on the plains. On arrival of the helicopters, three parties were set out in the mountains south-west of South Nahanni and moved progressively west and south, being withdrawn in late July from the south to a camp which was established at Fort Liard.

The area north-west of South Nahanni was reached directly from the base camp and from a camp set up above Virginia Falls on South Nahanni River, from which a party of three geologists and one helicopter operated. A thick section exposed on several mountains in the vicinity was examined, the geologists and assistants being lifted to the tops of the mountains as required. Working the section downhill saved a great deal of the geologists' time and energy. Remaining helicopter time each day was used by the third geologist for mapping the surrounding country.

Old Fort Island on Mackenzie River near Wrigley was the site of the last camp of the operation. During the move most of the geological parties were established at camps in the intervening region. They were later moved into the western ranges of the Mackenzie Mountains and, as the season drew to a close, to locations within the eastern ranges and the Franklin Mountains east of the river. By the end of August most of the objectives had been met. Equipment was taken out by barge to Fort Nelson and the party returned via Yellowknife.

During the season of four months, the bedrock and glacial deposits were mapped in an area of 100,000 square miles, and 225,000 ft. of stratigraphic section were described and sampled, and fossils collected. Approximately 450 hours were flown by each of the three aircraft. The cost of field operations was probably considerably less than that of standard survey methods obtaining the same information, if it were indeed possible to penetrate systematically this northern country by other than aerial means.

UNITED STATES NAVY HYDROGRAPHIC SURVEYS IN CANADIAN WESTERN ARCTIC, 1957

[Summarized from U.S. Navy press releases.]

During the summer of 1957 the United States Navy Hydrographic Office carried out survey operations in the Canadian Western Arctic. The survey unit consisted of the United States Coast Guard ships *Storis*, *Bramble* and *Spar*, under the command of Commander H. C. Wood, U.S.C.G. The senior hydrographer was Commander T. K. Treadwell, U.S.N., who preceded the unit to the area in late July, and joined it at Cambridge Bay. Each ship carried three civilian hydrographers and *Spar* a civilian oceanographer as well. R. Willis, of the Canadian Hydrographic Service, accompanied the unit as Canadian observer.

The unit left Seattle on 1 July and was accompanied as far as Amundsen Gulf by the United States Navy icebreaker *Burton Island*. Point Barrow was reached without

incident on 12 July, and two helicopters were transferred to *Storis* from *Burton Island*. The passage to Amundsen Gulf was also uneventful and from there *Burton Island* returned to Point Barrow on the 17th, after refuelling the three ships. On 19 July an ice reconnaissance flight was made by the commanding officers of the three ships, in a naval R 4 D from Point Barrow; in Dolphin and Union Strait severe ice conditions were observed. During the return of the officers from shore to ship by helicopter one machine crashed. There were no casualties but *Storis* had to return west to collect another helicopter from *Burton Island*. The unit left Amundsen Gulf on 22 July and experienced extremely difficult ice conditions before reaching Cambridge Bay on 6 August. On several occasions the ships were beset, sometimes being lifted almost clear of the water by ice pressure, but they suffered no serious damage.

The unit continued eastwards on 10 August, had a difficult passage through Queen Maud Gulf to Simpson Strait between the 11th and the 13th, and then worked in Simpson Strait, which was ice free, until the 23rd. The ships then returned to Queen Maud Gulf, where ice conditions had improved, and carried out limited sounding operations for four days. James Ross Strait was sufficiently free of ice for work to be carried out there from 20 August to 1 September. The unit then sailed north and on the 3rd met H.M.C.S. *Labrador* which assisted it through the ice in Franklin Strait. Two days were then spent sounding and charting the approaches to Bellot Strait and passage through the strait was made behind *Labrador* on 6 September.

The ships then sailed for Boston by way of Resolute and Lancaster Sound, the first United States ships to complete the North-West Passage.

THE TRANS-ANTARCTIC EXPEDITION, 1955-58:

OPERATIONS IN 1957-58

By J. A. Heap. Previous accounts of the expedition have appeared in the *Polar Record*, Vol. 8, No. 53, 1956, p. 172; No. 54, 1956, p. 264-67; No. 55, 1957, p. 356-57 and No. 57, 1957, p. 532.]

Both the Weddell Sea party and the Ross Sea party spent a very active winter preparing for the trans-Antarctic crossing. In March 1957 Sir Edmund Hillary, with J. G. Bates, M. Ellis and P. D. Mulgrew, sledged to Cape Crozier from "Scott Base" and retrieved various articles left there by Dr Wilson, Lieut. Bowers and A. Cherry-Garrard in 1911.

Spring sledging began from "Scott Base" on 5 September and included dog and tractor journeys to Gneiss Point, and dog journeys to Ferrar Glacier and Cape Crozier. On 14 October the main southern journey began. The tractor train of one Weasel and three Ferguson farm tractors reached the depot at the foot of Skelton Glacier on 10 October and, after climbing 8000 ft., arrived at "Plateau Depot" on the 31st. There it waited until 12 November for supplies to be flown in. "Depot 480" was established on 25 November, in lat. 79° 51' S., long. 148° E., 480 miles from "Scott Base" and 210 miles from "Plateau Depot". "Midway Depot" was established 80 miles further south and then "Depot 700", 700 miles from "Scott Base". On 10 December Sir Edmund Hillary, Bates, Ellis and Mulgrew left "Depot 700" and reached the South Pole on 4 January 1958 after 500 miles of reasonably easy going. The party had averaged 22 miles a day on each travelling day of the journey.

Dr Fuchs was unable to start his Spring journey until 5 October 1957, when two Weasels and a Snocat set out to reconnoitre a route to "South Ice". The journey, although only 270 miles by air, proved to be 400 trail miles owing to frequent detours to avoid heavily crevassed areas. On a number of occasions the vehicles were saved from falling down crevasses by the Terylene safety ropes with which they were linked together. "South Ice" was reached on 14 November with considerable help from air

and dog-sledge reconnaissance over parts of the extremely difficult terrain. The main party left "Shackleton" with three Snocats, two Weasels and one Muskeg on 25 November and reached "South Ice" on 22 December. Warm weather since the reconnaissance party marked the trail had made conditions still more difficult. The complete overland party left "South Ice" on 25 December. It consisted of Dr V. E. Fuchs, K. V. Blaiklock, D. E. L. Homard, J. J. la Grange, R. A. Lenton, H. Lister, G. Lowe, D. L. Pratt, G. T. D. Pratt, A. F. Rogers, J. Stephenson and D. G. Stratton. After covering 575 miles in 26 days the party reached the South Pole on 19 January 1958. Meanwhile the Royal Air Force party, Squadron Leader J. Lewis, Flight-Lieut. G. Haslop, Sergt. P. Weston and D. Williams, flew from "South Ice" to "Scott Base" on 6 January in the "Otter" aircraft, a record Antarctic flight for a single-engine aircraft.

Leaving the South Pole on 24 January, Dr Fuchs reached "Depot 700" on 7 February. There he was rejoined by Sir Edmund Hillary, who had been flown from the South Pole to "Scott Base" by United States aircraft, and then back to "Depot 700" in the "Beaver" belonging to the New Zealand party. The trans-Antarctic party left "Depot 700" on 10 February and reached "Midway Depot" on the 11th.

Mechanical trouble with the Sno-cats held the party up for four days, and "Depot 480" was not reached until the 17th. Complete "whiteout" conditions now delayed progress but "Depot 290" was reached on the 23rd. The party then descended the Skelton Glacier without incident and arrived at "Scott Base", the end of the journey, on 2 March 1958, 99 days after leaving "Shackleton".

The scientific work of the expedition continued without interruption during the journey, and included the taking of seismic soundings every 30 miles, and gravity and glaciological measurements at intervals of 10 to 15 miles as far as the South Pole; after that seismic soundings were taken every 60 miles.

Three days later both the trans-continental and the New Zealand parties left Antarctica in H.M.N.Z.S. *Endeavour*, and arrived at Wellington on the 17th.

NOTES

ARCTIC INTERNATIONAL GEOPHYSICAL YEAR STATIONS,
1957-58

For the purpose of the accompanying map the Arctic is defined as the area north of the 50° F. July isotherm. The stations shown are those planned; it cannot be assumed that every one of these has actually been occupied. It is not possible to fix exactly the positions of the four drifting stations in the central polar basin, two Soviet and two United States, but they are shown roughly in the vicinity of the estimated positions at the start of the International Geophysical Year. The United States stations are the two nearest



Arctic International Geophysical Year stations, 1957-58

the pole. All other stations are of the nationality of the territory in which they are situated, except the following:

Svalbard: In Nordaustlandet the station is Swedish-Finnish-Swiss. In Vestspitsbergen there is a Soviet-Polish station and a Soviet station at Barentsberg, also a Polish station at Hornsund. In Bjørnøya there is a Norwegian-Swedish station.

Greenland: Two United States stations, at Thule airbase and Narssarssuaq, two joint United States-Danish stations, on the ice sheet and at Godhavn.

Canada: Two United States stations, both in Frobisher Bay; four United States-Canadian stations, at Alert, Eureka, Isachsen and Resolute; one United States station in Davis Strait.

"ICEPORTS"

Late in 1956 the Advisory Committee on Antarctic Names of the United States Board on Geographic Names was asked by the United States Navy to assign names to certain embayments in Antarctic ice fronts where Operation "Deep Freeze" ships had moored in the past and were likely to moor in the future. After discussion with the Antarctic Place-Names Committee in the United Kingdom, the Australian Antarctic Place-names Committee, and the New Zealand authorities, agreement has been reached on the following new geographical term and its definition for official use in the maps and charts of these countries.

ICEPORT: An embayment in an ice front, often of a temporary nature, where ships can moor alongside and unload directly onto the ice shelf.

In accordance with this agreement, the three new place-names "Atka Iceport", "Erskine Iceport" and "Godel Iceport" first appeared on U.S. Hydrographic Office chart H.O. 2562, 1956.

BRIAN ROBERTS

SOVIET CO-ORDINATING COMMISSION FOR PERMAFROST STUDIES

[From *Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya* (News of the Academy of Sciences of the U.S.S.R. Geographical Series), 1957, No. 4, p. 138-39.]

The widespread need in the U.S.S.R. to study permafrost and related engineering topics has led to overlap of work among research institutions, and this has prompted the setting up of an interdepartmental Co-ordinating Commission for Permafrost Studies [Koordinatsionnaya Komissiya po Merzlotovedeniyu] attached to the V. A. Obruchev Institute for Permafrost Studies [Institut Merzlotovedeniya imeni V. A. Obrucheva]. The first meeting of this Commission took place in Moscow on 1 and 2 March 1957. It was decided to hold full meetings at least annually, the work to be done between these by a Bureau, to which the following were elected:

P. F. Shvetsov, Director of the V. A. Obruchev Institute of Permafrost Studies (Chairman)

I. F. Nasedkin, Deputy Director of the All-Union Institute of Transport Construction [Vsesoyuznyy Institut Transportnogo Stroitel'stva]

M. V. Kim, Head of the Research section of the planning office of the Noril'sk Mining and Metallurgical Combine

A. I. Kalabin, Head of the permafrost section of the 1st Research Institute of Dal'stroy

V. A. Kudryavtsev, in charge of the department of permafrost of Moscow State University

There are two other members, who were not named in the announcement, and the secretary is A. M. Chekotillo, a senior research worker in the V. A. Obruchev Institute of Permafrost Studies. Other bodies, not apparently represented on the Bureau, but closely concerned in permafrost studies, are the Vorkuta coal combine "Vorkutaugol'", the Research Institute for Foundations and Subterranean Constructions of the Academy of Construction and Architecture of the U.S.S.R. [Nauchno-Issledovatel'skiy Institut Osnovaniy i Podzemnykh Sooruzheniy Akademii Stroitel'stva i Arkhitektury SSSR], the West Siberian and Far Eastern Branches of the Academy of Sciences of the U.S.S.R. [Akademiya Nauk SSSR], and "Gidroproyekt", an institution of unknown responsibilities active in north-western Siberia.

TOWN POPULATIONS IN THE SOVIET ARCTIC, 1956

[From *Narodnoye khozyaystvo RSFSR. Statisticheskiy sbornik (Economy of the R.S.F.S.R. Statistical handbook)* (Moscow, 1957), p. 48-56.]

Recently released Soviet statistics give official estimates for the population of the following towns in the Soviet Arctic in early 1956:

Arkhangel'sk	238,000	Khanty-Mansiysk	19,000
Murmansk	168,000	Dudinka	17,000
Noril'sk	92,000	Salekhard	16,000
Yakutsk	63,000	Nar'yan-Mar	11,000
Petropavlovsk-Kamchatskiy	58,000	Anadyr'	5,000
Magadan	55,000	Tura	2,000
Sykt'yvkar	51,000		

This list comprises only centres of administrative areas above the level of *rayon* [region], and other towns of over 50,000 inhabitants. It is not, therefore, a complete list of substantial population centres in the Soviet Arctic.

DIAMONDS IN YAKUTSKAYA, A.S.S.R.

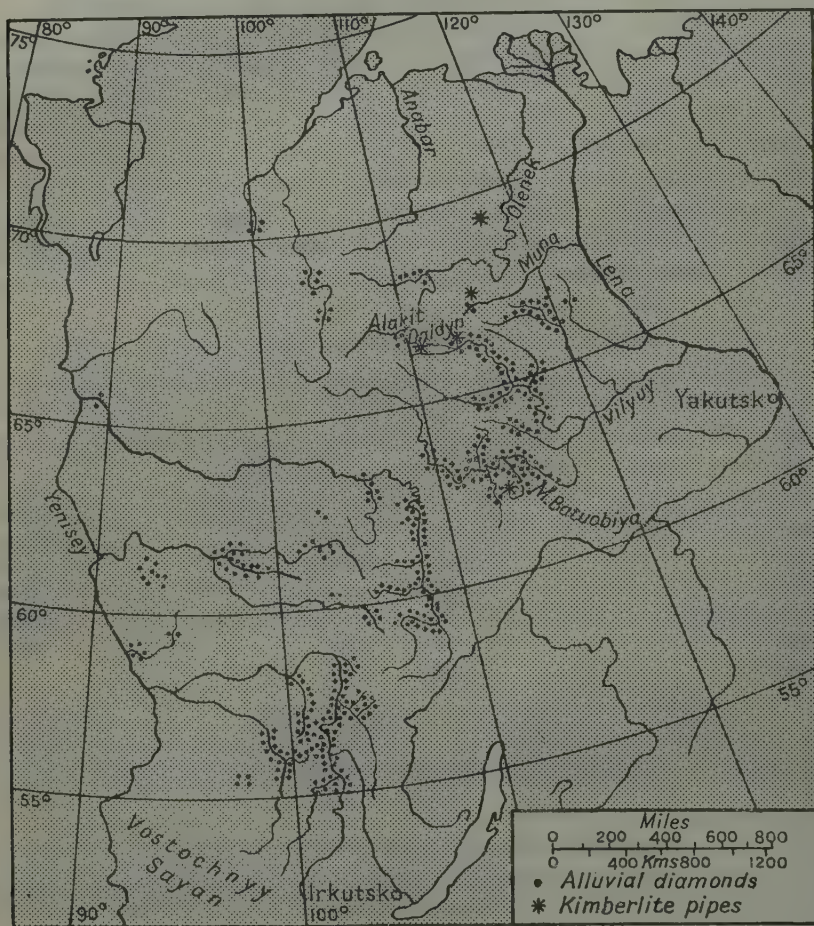
[From A. P. Burov and V. S. Sobolev, ed. *Almazy Sibiri [Diamonds of Siberia]*, 1957, and papers by V. S. Trofimov and V. O. Ruzhitskiy in *Priroda [Nature]*, 1957, No. 7, p. 10-19 and No. 12, p. 88-91.]

In view of the almost total lack of diamonds in the territory of the U.S.S.R., a series of Soviet expeditions have investigated the possibility of finding diamonds in Siberia. Discoveries of alluvial diamonds were made in the region between the Yenisey and the Lena in 1948, and there have been intensive explorations as a result.

The main diamond-bearing area has been found to be a very large one, stretching from the Yenisey to the Lena, north to the Anabar depression and south to the foothills of the Vostochnyy Sayan. But the area of possible

commercial exploitation is smaller, embracing most of the basin of the Vilyuy, a left tributary of the Lena, and extending northwards to include part of the Olenek basin: an area roughly 600 miles from north to south, and 400 miles from east to west.

In addition to the numerous alluvial diamond deposits identified, a kimberlite pipe was found in 1954 on the banks of the Daldyn, a tributary of the Vilyuy.



Occurrence of diamonds in Yakutskaya, A.S.S.R.

By the end of 1956 many other pipes had been discovered, in five general areas: the Daldyn region, the basin of the Malaya Batuobiya, the upper reaches of the Alakit and of the Muna, and the middle and lower reaches of the Olenek. Some have been excavated to a depth of 12 m., but only a few are of commercial significance. The five areas lie in a belt running south-south-west to north-north-east, some 600 miles long and from 20 to 150 miles wide.

The pipes are among limestones, dolomites and marls of the Cambrian and Ust'-Kut series Ordovician, and this to some extent puts a lower limit on their age. Some pipes contain intrusions in the form of xenolite traps, arguing post-Permian or Triassic age for the diamonds. The upper limit is not yet determined. All the diamonds so far found in areas worth exploiting have been Mesozoic, whether in kimberlite pipes, or in the rich alluvial deposits originating from them. These diamonds are octohedral in form. To the south and west of this area of relatively frequent occurrence more alluvial diamonds are found. They are Pre-Cambrian, dodecahedral in form, and larger in size. Their place of origin is not yet known.

The pipes are in many ways similar to those found in South Africa. The upper surface is less eroded, however, possibly due to the colder climate. Further, Soviet geologists tentatively postulate a common magmatic base for a group of pipes, in distinction to the situation in South Africa, where each pipe is thought to have an independent magmatic base, and where, therefore, it is impossible to generalize about the likely diamond content of a group of pipes.

The diamond content of the richest pipes exceeds 1 carat per cu.m. The alluvial deposits are richest in close proximity to the pipes, commonly in flood terraces, but some diamonds have been found as far as 600 km. downstream from their source. The size varies from hundredths of a carat to 32.5 carat, but the average weight of all diamonds found on the Siberian platform up to 1956 is 0.07 carat. The majority are colourless, and some have inclusions and stains. Those from the pipes, however, are almost all without stains. As with the other major diamond-producing areas of the world, by far the greater part of the stones recovered are suitable for industrial use, with only comparatively few of appropriate quality for use in jewellery.

The Soviet Government is naturally planning large-scale exploitation of these resources. The conditions are difficult, there being in the area no supply of power, no local labour, and no transport network other than the rivers; but none of these difficulties is insurmountable.

These major discoveries stimulated further investigations, which have not yet, however, revealed deposits of commercial significance. In 1955-56 a small number of alluvial diamonds were found in the European part of the Soviet Arctic: seven in the region of the Pechora-Mezen' watershed, and one near Arkhangel'sk. No kimberlite pipes have been found yet, but there are indications in these areas that they may be present. It is further reported that diamonds have been discovered on the upper course of the Aldan, also in Yakutskaya A.S.S.R., but no details are available yet. The effect of all these discoveries on the world diamond market is likely to be considerable.

METHOD OF HASTENING MELTING OF FLOATING ICE

From an article by I. Konovalov and R. Shcherbakova in *Vodnyy Transport* [Water Transport], 11 November 1957.]

The long-known method of sprinkling dark material on ice to hasten melting has recently been successfully applied on a large scale in the U.S.S.R. In 1955,

600 metric tons of foundry sand were sprinkled from aircraft over the mouth of the Severnaya Dvina at Arkhangel'sk, at a density of 300 to 600 kg. per hectare. To this 50 to 100 kg. per hectare of salt was added for the areas expected to be the most difficult. The operation was performed a month before the expected date of break-up, and resulted in the ice actually breaking up 15 to 20 days earlier in the treated areas than in the untreated. The method was found to be one-sixtieth as costly as operating icebreakers in the same place.

The same system has been used on the Lena and other Soviet rivers, both to speed up melting in the vicinity of wharves and places where ships have wintered, and to help avoiding ice jams. Materials found successful include coal ash, coal dust, or a half and half mixture of small coal and sand. The size of the grains is important. If they are too small, as in the case of soot, cover on the ice tends to become uneven and some effectiveness is lost. If, on the other hand, the grains of coal or sand are too big, they act as an insulating layer and retard melting. Snow lying on the darkening material halts melting, but only temporarily, because soon after the snowfall solar energy reaches through again to the material.

SOVIET ATOMIC ICEBREAKER, *LENIN*

[From *Soviet News*, 6 December 1957, *Sudostroyeniye* [Shipbuilding], 1957, No. 1, p. 11-14; *Lloyd's List*, 6 December 1957, and *Vodnyy Transport* [Water Transport], 14 November 1957.]

The first surface vessel to employ nuclear energy is the icebreaker *Lenin* which was launched in Leningrad on 5 December 1957. The ship is 134 m. (440 ft.) long and 27.6 m. (90 ft.) in the beam, draws 9.2 m. (30 ft.) and displaces 16,000 tons. The engines are designed to develop 44,000 h.p., with a top speed of 18 knots. The fuel is slightly enriched uranium; the reactor, of the pressurized water type as used in the United States submarine *Nautilus*, produces steam for turbines, which drive the three after propellers (there are no forward propellers). The hull is V-shaped in cross-section fore and aft and the thickness of the plating is 32 mm. (1.3 in.) amidships, increasing gradually to 52 mm. (2.1 in.) at bow and stern. The very small amount of fuel used will permit the ship to remain at sea for periods of a year or more. P. A. Ponomarev, a senior icebreaker captain, has been given command of the ship.

SCIENTIFIC RESEARCH STATIONS IN NORTH SWEDEN,

1903-57

[Summarized from articles by C. J. Östman (*Norrländsk Tidskrift*, 1955, Nr. 2, p. 27-29; Bengt Hultqvist (*Nature*, Vol. 180, No. 4591, p. 828-30); and in *Statens Naturvetenskapliga Forskningsråds Årsbok*, Årg. 9, 1955 (published 1956), p. 339-41, and from *Dagens Nyheter*, 23 September 1956, 11 February 1957, 20 June 1957, 3 July 1957.]

Four scientific research stations in north Norrland have been, since 1952 grouped under the name of Kungliga Vetenskapsakademiens forskningsstationer i Övre Norrland [Research Stations of the Royal Academy of Science

in Upper Norrland]. The chairman of the board which controls them is Rickard Sandler and the vice-chairman is Professor R. Sievert.

Abisko naturvetenskapliga station, the oldest, was established in 1903 at Vassijaure, near the Norwegian border, west of Torneträsk, and moved in 1912 to its present site at Abisko on the southern shore of Torneträsk. An observatory was built and meteorological, seismic and geomagnetic observations, auroral photography and cloud studies were carried out; the emphasis is now on botanical and zoological studies. The station is visited every summer by considerable numbers of research workers, both Swedish and foreign. Summer courses have been arranged each year since 1951. Dr Gustaf Sandberg is in charge of the station.

Sareks naturvetenskapliga anläggningar was also established at the beginning of this century, on the initiative of the late Professor Axel Hamberg. It consists of five observation huts in the great Sarek national park, between approx. lats. 67° and $67^{\circ} 30' N$. The biggest of these is at the top of Pårtetjåkko, 1834 m. A permanent observer was formerly stationed here, and valuable meteorological observations were obtained. Investigations at these stations, under the direction of Hilding Köhler, professor of meteorology at Uppsala, are now more sporadic; in recent years the emphasis has been on water-level measurements in Rapadalen. The huts are lent to students carrying out field work in the area.

Tarfaladalens glaciologiska observatorium was established in 1946 by Professor Hans Ahlmann. It consists of the scientific station in the valley east of Kebnekajse and a hut near the summit of Kebnekajse itself. A long-term glaciological programme is being carried out here, and there is co-operation with similar institutions in Alaska, Iceland and Norway.

Kiruna geofysiska observatorium is the newest of the four stations. A commission, under the chairmanship of Professor Rolf Sievert, was set up in 1944 to investigate the amalgamation of research stations in north Sweden and recommended the establishment of a geophysical observatory at Kiruna. One of the objects of the new station was to take over the continuous observations in geomagnetism, seismology and meteorology until then carried out at Abisko. Although favourably disposed, the authorities took no immediate action, and Vetenskapsakademien therefore made a start during the summer of 1948 on a station about 8 km. east of Kiruna, at Kaupinnen. In the following years facilities were provided for the study of ionospherics, under the direction of Professor O. Rydbeck; seismology, under the direction of M. Båth; cosmic rays, under the direction of Professor Hannes Alfvén and Arne Eld Sandström; meteorology, under the direction of Professor Köhler and Sveriges Meteorologiska och Hydrologiska Institut, and geomagnetism, under Dr Nils Ambolt.

Funds were finally provided by the state, the city of Kiruna and Vetenskapsakademien and a large new building was completed in 1957. The station now consists of the main building and about ten smaller ones. The main building contains laboratories, dark-rooms, administrative offices, library and seminar room, dining-room and lounge facilities, living quarters and a workshop. A glass

laboratory is on the top floor, and above this is an open roof providing all-round visibility. Equipment can be mounted on the roof on supports going down to foundations independent of the structure of the building itself.

Bengt Hultqvist is director of this new station. International co-operation is welcome and proposals for research programmes should be addressed to the Director, Kiruna Geophysical Observatory, Kiruna, Sweden.

SCANDINAVIAN AIRLINES SYSTEM'S SEA ICE REPORTING SERVICE

[Summarized from an article by Odd Medbøe in *Polarboken*, 1957, p. 121-23.]

Regular sea ice observations are now carried out by Scandinavian Airlines System over the waters between Svalbard and Greenland. This area is crossed four times a week throughout the year by the company's DC-7C Global Expresses on their flights between København and Tokyo via the North Pole. These flights began in February 1957. The observations are made from a height of about 6000 m. by the crew of the aircraft, who have been instructed for this purpose. Reports are sent to the Scandinavian Airlines System's radio stations at Andenes in north Norway and Isfjord in Vestspitsbergen. In cloudy weather and during the period of winter darkness observations are made with the help of radar. On the initiative of the Danish Arktisk Institut, cameras have also been mounted in the aircraft, and during each flight a series of photographs are taken of ice conditions. These photographs are sent to Arktisk Institut in København and Norsk Polarinstitut in Oslo.

CANADIAN JOINT COMMITTEE ON OCEANOGRAPHY: WORKING GROUP ON ICE IN NAVIGABLE WATERS

[Summarized from minutes of the meeting of the Canadian Joint Committee on Oceanography held in Ottawa on 25 September 1957.]

A meeting of the Canadian Joint Committee on Oceanography was held in Ottawa on 25 September 1957 to set up a working group to co-ordinate the ice studies of the various government departments in Canada. It was attended by representatives of the following departments: Defence Research Board; Naval Weather Service; Fisheries Research Board; Geographical Branch, Department of Mines and Technical Surveys; Marine Services, Department of Transport; Meteorological Branch, Department of Transport; National Research Council; Department of Physics, McGill University; and of the Scott Polar Research Institute, Cambridge. T. A. Harwood, Defence Research Board, was elected chairman of the group.

Terms of reference adopted were:

- (a) To co-ordinate and encourage research in the field of ice in navigable waters. Particular attention should be paid to the following, especially in areas which directly affect the economic growth of Canada, with the aim of improving navigation in those areas:

- (1) the development of techniques for forecasting ice growth, degeneration, and movement;

- (2) studies of the physical properties of ice;
- (3) studies of the dynamics of the ice-air and ice-water interfaces;
- (4) climatological studies.
- (b) To promote the use of a standard terminology and codes for reporting ice by all operating agencies in Canada, and, through the Meteorological Branch representation on the World Meteorological Organization, to assist in bringing about the adoption of a standard nomenclature and code throughout the world.
- (c) To consider such related problems as may be referred to it from time to time by the parent committee.

It was agreed that priority should be given to studies of the following areas: Gulf of St Lawrence, from Quebec to the Strait of Belle Isle and Cabot Strait; Ungava Bay and eastern Hudson Strait and approaches; Hudson Bay and western Hudson Strait; northern re-supply routes.

It was further agreed that an inquiry should be made into the economic importance of extending the navigation season in the St Lawrence Seaway, in order to assess the priority of the research required.

DEWEY SOPER BIRD SANCTUARY AND BOWMAN BAY GAME PRESERVE, BAFFIN ISLAND

[From information provided by the Canadian Wildlife Service and in the *Arctic Circular*, Vol. 10, No. 1, 1957, p. 14-15.]

Two sanctuaries have recently been established between Bowman Bay and Koukjuak River on the south-west coast of Baffin Island.

The Dewey Soper Bird Sanctuary was established in June 1957 and has an area of 3150 sq. miles. It covers the site of an important breeding ground of the Blue Goose (*Chen caerulescens*), Snow Goose (*C. hyperborea*) and, to a lesser extent, the Common Brant (*Branta bernicla*) and the Hutchin's Goose (*B. canadensis hutchinsi*).

All hunting is prohibited in the area, but exploration and development of mineral resources are allowed under permit from the Canadian Wildlife Service, the agency responsible for the administration of both sanctuaries. In order to protect geese from aircraft, flying at below 2500 ft., and landing, are prohibited between 15 May and 30 September each year.

The Bowman Bay Game Preserve has an area of 500 sq. miles and is included in the southern part of the Dewey Soper Bird Sanctuary. It was established in March 1957. No hunting is allowed in it and no one may enter without written permission from a game officer.

DANISH POLAR TRANSPORT VESSEL, *THALA DAN*

[Summarized from information provided by J. Lauritzen Lines.]

The motor vessel *Thala Dan* was built in 1957 by J. Lauritzen Lines, and left for Australia on 13 October to replace *Kista Dan* as supply ship for the Australian National Antarctic Research Expedition.

Thala Dan is a sister ship of *Magga Dan*¹ and has almost identical measurements and equipment except that the new ship has no refrigerating machinery. Her cubic capacity and dead-weight tonnage are therefore larger; as a normal cargo vessel with twelve passengers the dead-weight tonnage is 2130 tons with a draft of 6.6 m. (20 ft. 7 in.).

WINTER WEATHER AT THE SOUTH POLE, 1957

Summarized from a note in *Transactions, American Geophysical Union*, Vol. 38, No. 6, 1957].

On 17 September 1957 the surface temperature at the Amundsen-Scott Station at the South Pole was -102°F. (-74°C.), a new record low temperature. The previous record was -100.4°F. (-73°C.), which was registered on 11 May 1957 at the same place. During the intervening months, covering mid-autumn to late winter, the temperature fell below -95°F. (-71°C.) seventeen times.

The mean temperature throughout the winter of 1957 was -73°F. (-58°C.), and for 90 per cent of the time it was below -58°F. (-50°C.). The maximum temperature reached was -26°F. (-32°C.). The coldest period was the first seventeen days of September, with an average temperature of -83°F. (-64°C.), and for four days, including 17 September, it never rose above -90°F. (-68°C.). By the 25th it had risen to -73°F. (-58°C.). It is possible that lower temperatures may be recorded at the U.S.S.R. station "Sovetskaya" at the "Pole of Inaccessibility", due to greater height and distance from the sea. Before the International Geophysical Year the lowest surface temperature on record was -93.7°F. (-70°C.), at Verkhoyansk in Siberia.²

The mean wind speed was 16 m.p.h. with peak gusts of about 53 m.p.h.; there were only 25 hours of calm weather during the whole winter.

At the time of the new record low temperature there was a pronounced temperature inversion over the South Pole. At 30 ft. (10 m.) above ground the temperature was 27°F. (-3°C.) higher, and at 1400 ft. (427 m.) it was 72°F. (22°C.) higher, than at surface level. Above 1400 ft. the temperature again decreased with altitude. Marked vertical temperature inversions, frequently found over polar regions, are accentuated over the South Pole; the dry atmosphere on the high polar plateau transmits outgoing heat radiation more readily than sea-level atmosphere.

The temperature régime in Antarctic coastal stations consists of a rapid drop in temperature after the beginning of winter darkness, then a significant rise in the mean monthly temperature and finally another drop, late in the winter, to the minimum monthly mean for the year. The records from the United States International Geophysical Year Byrd and Amundsen-Scott stations indicate that this régime also holds for inland areas.

¹ *Polar Record*, Vol. 8, No. 55, 1957, p. 373-74.

² *Polar Record*, Vol. 6, No. 46, 1953, p. 821-22.

REGULATIONS CONCERNING PLACE-NAMES IN THE FALKLAND ISLANDS DEPENDENCIES

The following regulations concerning the proposing of new place-names and the alteration of existing place-names in the Falkland Islands Dependencies were published on 1 August 1957 in the *Falkland Islands Gazette*, Vol. 66, No. 11, p. 92. The Place-names Ordinance, upon which these regulations are based, was reprinted in the *Polar Record*, Vol. 8, No. 56, 1957, p. 458-59.

Falkland Islands Dependencies

THE PLACE-NAMES ORDINANCE, 1956

REGULATIONS

(Under section 4 of the Ordinance)

E. P. ARROWSMITH
Governor

No. 1 of 1957

His Excellency the Governor in exercise of the powers vested in him by section 4 of the Place-names Ordinance, 1956, is pleased to make the following Regulations:

1. These Regulations may be cited as the Place-names Regulations, 1957.

2. (1) Every suggestion or recommendation of or for the addition of any place-name to the list of place-names in force for the time being, or for any alteration thereof, shall be made to the Colonial Secretary either directly or through the Under-Secretary of State, Colonial Office, London.

(2) Every suggestion or recommendation shall be in writing and shall contain particulars of the physical feature or place with which the suggestion or recommendation is concerned sufficient to render it easily recognizable, together with particulars of its geographical position, and shall be accompanied by a map or plan showing its position.

(3) A suggestion or recommendation for the alteration of a place-name appearing in the list of place-names in force shall state the reasons for such alteration.

Made by the Governor at Stanley on the 1st day of August, 1957.

A. G. DENTON-THOMPSON,
Colonial Secretary

ADMINISTRATION OF NORWEGIAN TERRITORIES IN THE ANTARCTIC

[A Norwegian law of 21 June 1957, published in *Norsk Lovtidende*, No. 25, 1957, p. 692, makes provision for the administration of Bouvetøya, Peter I Øy and Dronning Maud Land.]

Translation

We HAAKON, King of Norway, make known: that there has been laid before Us the resolution of the Storting of 15 June 1957, worded as follows:

I. In the law of 27 February 1930 concerning Bouvetøya and Peter I Øy the following amendments are made:

The title shall be: Law concerning Bouvetøya, Peter I Øy and Dronning Maud Land.

Paragraph 1 shall read: Bouvetøya, Peter I Øy and Dronning Maud Land (450° E.-20° W.) is subject to Norwegian sovereignty as a dependency.

Paragraph 2, first section, shall read: Norwegian private law and penal law and Norwegian legislation concerning the administration of justice shall apply to Bouvetøya, Peter I Øy and Dronning Maud Land. The extent to which other laws shall apply is to be determined by the King. The King may make amendments to these laws and to the legislation concerning the administration of justice as local conditions require.

II. This law comes into force immediately.

Therefore We have approved and confirmed, as We do also approve and confirm the same as law, under the seal of the realm.

Given at Oslo Palace on 21 June 1957
In the absence of His Majesty the King

EINAR GERHARDSSEN

OLAV
(L.S.)

LEIF ØSTERNE

OBITUARY

HANS BOGEN, the Norwegian author, was born at Sandefjord, Norway, on 27 January 1899 and died on 6 November 1957. Among his works are a history of Norwegian whaling, *Linjer i den norske hvalfangsts historie* (Oslo, Aschehoug, 1933) and two whaling company histories, *Firma Thor Dahl, Sandefjord, 1887-1937* (Oslo, Blix, 1937) and *Aktieselskabet "Ørnen" 10/1 1903-10/1 1953* (Publikasjon Nr. 19 fra Kommandør Chr. Christensens Hvalfangstmuseum i Sandefjord, 1953). He also wrote a biography of Lars Christensen (*70 år. Lars Christensen og hans samtid*. Oslo, Tanum, 1955).

HALLVARD OPHUS DEVOLD was born in Norway in 1898 and died on 10 September 1957. Between 1920 and 1926 he worked on meteorological stations in Finnmark and Svalbard, then took part in Nils Foldevik's north-east Greenland expedition which established a meteorological station at Myggbukta. In 1920 he helped to found an arctic hunting company, Arktisk Næringsdrift A/S, which played an important part in the dispute between Denmark and Norway over east Greenland. On his own initiative Devold annexed the area between lat. $71^{\circ} 30' N.$ and $75^{\circ} 40' N.$ in the name of Norway. The Norwegian Government confirmed his action, but in 1933 the Hague Court declared the occupation illegal. He took part in Riiser-Larsen's unsuccessful expedition to Antarctica in 1932-33, then in 1933-34 he was in charge of Isfjord Radio in Vestspitsbergen. In 1940 he was appointed secretary at Norges Svalbard- og Ishavs-undersøkelser in succession to John Gæver, who had been captured by the Allies while leading a relief expedition to the Norwegian stations in east Greenland. In 1941 Devold was captured on a similar mission, and was interned for the remainder of the war. Since 1950 he had been in charge of a curing factory in Norway.

FREDERICK LYNGE, representative of Greenland in the Danish folketing, died on 1 November 1957. He was born on 1 August 1889 at Qôrnoq, near Godthåb. His father and brothers were hunters, but he was sent to the teachers' training college in Godthåb in 1903 and in 1909 went to Denmark for further education. His command of Danish was to be of great assistance to him. On his return in 1911 he was appointed teacher in Jakobshavn. In 1913 Lyngé joined Den Kgl. grønlandske Handel, and served at Akúnâq, Egedesminde, and Disko where he became kolonibestyrer [factor or "Colony" manager]. He resigned from this post in 1950. He was a member of the landsråd [provincial council] for Nordgrønland from 1917 until 1951, except for one short interval. He was then elected to the single landsråd for the whole of Greenland created under the new administrative system. In 1939 Greenland delegates were for the first time sent to København to meet Rigsdagens Grønlandsudvalg [permanent parliamentary committee for Greenland] and Lyngé was a member of this and the second delegation in 1945-46. In 1953 he was elected by the northern constituency as one of the first two representatives from Greenland in the Danish folketing; he was re-elected in 1957.

Lyngé was a forthright champion of hunters and the independent bread-winner, his inclinations were conservative and he was an opponent of over-rapid change in Greenland society.

RECENT POLAR LITERATURE

This selected bibliography has been prepared by R. J. Adie, Terence Armstrong, T. H. Ellison, Amorey Gethin, J. W. Glen, W. B. Harland, H. G. R. King, Brian Roberts and Ann Savours. Its main field is the polar regions, but it also includes other related subjects such as "applied" glaciology (e.g. snow ploughs and ice engineering). For the literature on the scientific study of snow and ice and of their effects on the earth, readers should consult the bibliographies in each issue of the *Journal of Glaciology*. For Russian material, the system of transliteration used is that agreed by the U.S. Board on Geographic Names and the Permanent Committee on Geographical Names for British Official Use in 1947 (see *Polar Record*, Vol. 6, No. 44, 1952, p. 546).

Reprints of "Recent Polar Literature", from Nos. 37/38 onwards, can be obtained separately (to allow references to be cut out for pasting on index cards) from the Institute, price 2s. 6d. for two reprints. Copies will be sent without charge to organizations with which the Institute maintains exchange arrangements and which notify their wish to receive them. Readers can greatly assist by sending copies of their publications to the library of the Institute.

To increase the usefulness of the bibliography entries have been arranged provisionally under subject headings in classified order according to the Universal Decimal Classification. When circumstances permit the decimal notation will be included, together with a key.

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ERRATA

The *Polar Record*, No. 57, September 1957

Plate facing p. 537. For Philip read Phillip.

The *Polar Record*, No. 58, January 1958

Page 26, line 29. For 435 read 436.

Page 52, line 4. For Tora Dan read Thora Dan.

Page 58, line 10. For held the chairs of read was also head of the faculty of.

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